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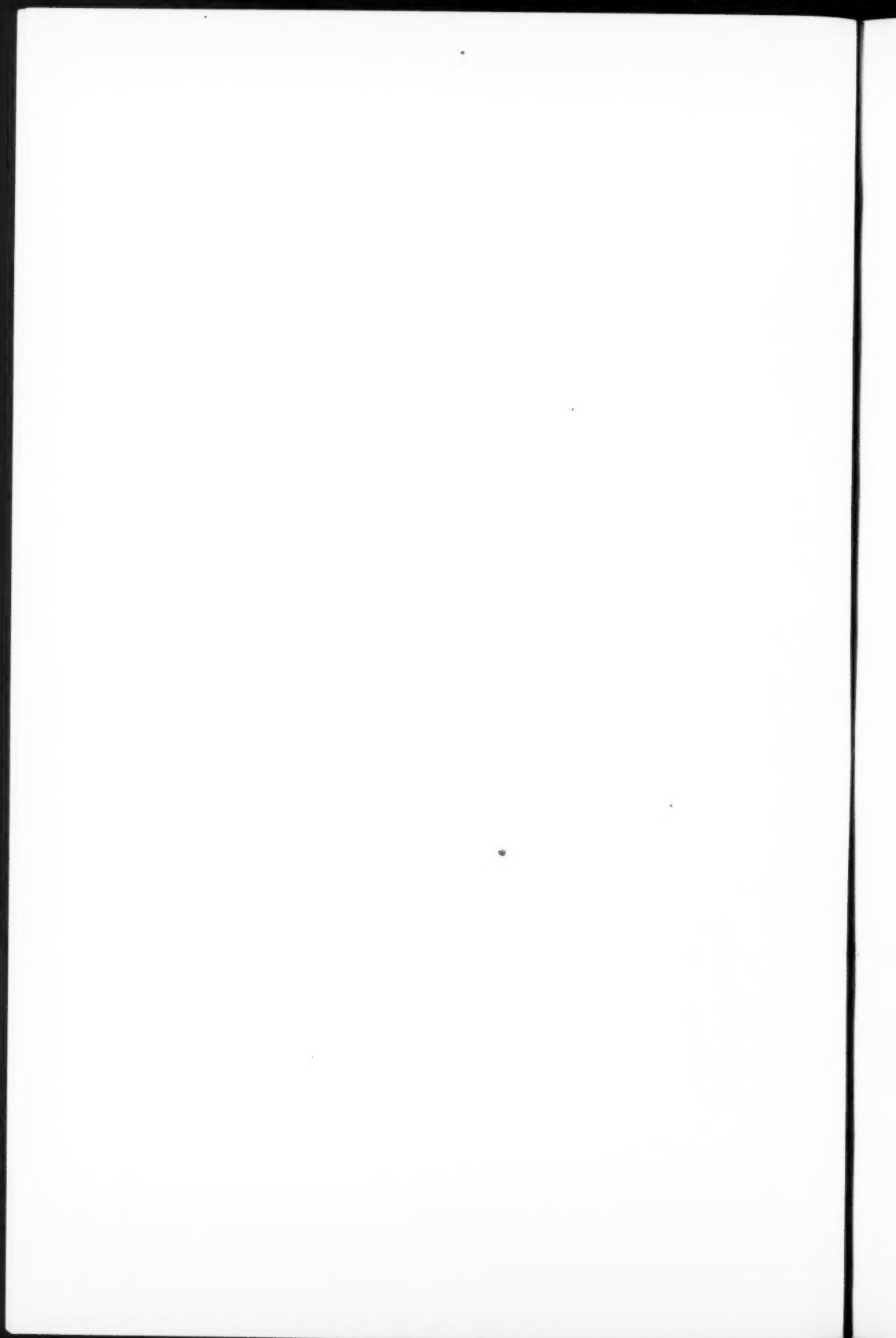
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MICHIGAN HISTORY MAGAZINE

Vol. XXII

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HISTORY OF AVIATION IN THE STATE OF MICHIGAN

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UNIVERSITY OF DETROIT

I

PIONEER ADVENTURES

MAN has always envied the bird and from the very earliest days has tried to imitate it.¹ Greek mythology relates how Daedalus and Icarus, thousands of years ago, attached wax wings to their shoulders to simulate a bird. Daedalus made a successful flight but Icarus flew too near the sun and the heat of the solar rays caused the wax on the wings to melt, letting him fall to the sea.

Aerial warfare was visioned as early as the 17th century, although it was not participated in until the world war of 1914-1918. In 1670, Francesco Lana, an Italian Jesuit, designed an airship for war purposes, but it was never built because he believed that if his airship was successful, no city would be secure from surprise attacks and the resulting heavy casualties. Lana's airship depended for buoyancy upon four

¹The compilation of the data was started by Mr. James V. Piersol, Aviation Editor of the *Detroit News*, in November, 1933. Due to Mr. Piersol's absence from Michigan during a subsequent period, he was unable to continue the work and complete it in time for the publication date. The author therefore undertook to complete this work from the data collected by Mr. Piersol and from information compiled in his own researches on this subject. The author is indebted to the many individuals and organizations who supplied the original data on the early aviation activities in Michigan and in particular, to the *Detroit News* for the use of their reference files and Mr. Piersol's notes.

It is possible that reference to some pioneer activities has been omitted from this history. This condition, if it does exist, is not due to a wilful omission of these data, but due to the failure of the author in his diligent research on the subject, to find any information on them.

copper balls which were entirely exhausted of air. The balls were each to be twenty feet in diameter. The fallacy of the design consisted in the condition that the walls would be too thin to withstand atmospheric pressure. The design, however, may be regarded as the prototype of the modern balloon.

Suggested development and designs for airships made their appearance from time to time throughout the world, but none were built until November 1782, when Stephen and Joseph Montgolfier launched a hot-air balloon which actually lifted a load. On June 5, 1783, at Annonay, France, they were successful in launching a balloon which was thirty-five feet (35') in diameter. It was filled with hot air and it attained a height of more than one mile.

The first successful man-carrying balloon ascension occurred on November 21, 1783, when Pilatre de Rozier and the Marquis d'Arlandes took off in a hot-air balloon at Lamotte Palace, near Paris, and they descended safely after a flight of twenty minutes.

EARLY MICHIGAN BALLOON FLIGHTS

The state of Michigan also played an important part in the early conceptions of the airship. About one hundred years ago, B. G. Noble, of Dexter, Michigan Territory, proposed a design which even at present appears workable and which incorporated many of the parts of today's successful airships. It was designed to use a conventional gas envelope and car. Vanes were provided for propulsion. The Dexter design was known as the "Aeronautic Steam-Car". Descriptions of this design appear in the August 1834 issue of the *American Railroad Journal and Advocate of Internal Improvement*. No records are available that this airship was built.

The first references to the actual operation of balloons in Michigan are found in the accounts of an accident to a balloon which drifted over Lake Michigan in 1875. In this balloon were Professor Donaldson, a professional aeronaut, and N. S. Grimwood, a newspaper reporter, who weighed off, intent on crossing Lake Michigan and landing on Michigan soil. The

balloon drifted eastward until it approached the Michigan shore, where it encountered a violent thunderstorm. The violence of the storm rendered the balloon unmanageable. All the ballast had been used to check the balloon's descent. More ballast was needed to prevent the balloon from falling into the water. Human ballast was the only weight left. A struggle followed, and Donaldson threw Grimwood overboard.

Relieved of Grimwood's weight, the balloon rose above the storm and carried Donaldson on a northeasterly course across the state. A week later, Donaldson was found injured and starving near Lake DeQuizes, Ontario. He died shortly afterward of his injuries.

By 1884 there was much discussion of balloons that would be steerable and would represent load-carrying airships in every sense. Activity in this field was centered in Jackson, Michigan, where Professor Hogan, a balloonist, carried on his experiments. To publicly demonstrate his accomplishments, and the utility of his balloon, he carried a wagon, in 1880, from Jackson to Clayton, Michigan, a distance of about twenty-eight miles. This preliminary success took him to New York where he was given charge of an unidentified airship, in which he was later killed.

During his early experiments in Michigan, E. D. Hogan had taught his younger brother, John Hogan, the technique of handling a balloon. After the elder Hogan was killed, John sought to take his brother's place as Michigan's premier aeronaut. His activity, however, in this field was very short. He was killed in a balloon ascension during the Detroit Exposition on August 30, 1891, when he lost his grip on a trapeze bar and fell from an altitude of about 1,000 feet.

The next year these aerial exploits were followed by Miss Gertie Carmo, who was the first Michigan woman to fly. She brought a balloon to the Detroit Exposition of 1892. Rain, a gusty wind and a premature darkness made inflation of the balloon's gas-bag difficult. By the time the crowd had gathered, the bag was only half-inflated. But not to disappoint the

people, she ordered the balloon weighed off. The balloon struck a tower on one of the exposition buildings during the ascension. Miss Carmo was thrown from the trapeze and was killed.

There were many other interesting early Michigan balloon and airship developments. In 1900, Joseph H. Martin, a Jackson cigarmaker, had designed a dirigible airship on which he claimed to have spent twelve years of study. There are no records which indicate that this airship had been built. In July, 1906, L. M. Driver, a Detroit balloonist, constructed the first dirigible in Michigan. He built it in Detroit in the plant of the Drihopa Airship Company at Brush Street and Alexandrine Avenue. It was shaped in the form of two cones drawn together at their bases, leaving a point at the nose and the stern. The internal structure was of spruce and it was covered with silk. The dirigible was 78 feet long and 17 feet in diameter at its greatest cross-section. This ship was intended to be a bomber, and was to be test-flown from Central Park, New York City. No records have been found of this flight. The Company was capitalized at \$75,000.

In 1908 a group of Detroiters, made up of Frederick A. Alger, William E. Metzger, Eugene W. Lewis, Roy W. Chapin, Howard E. Coffin and others, organized the Aero-club of Michigan. This club later became the Detroit Aviation Society, which is believed to be the first Aviation Society in the United States. The first activity of the club was the purchase of a free balloon of 80,000 cubic feet displacement in 1908. This balloon was piloted by Leo Stevens and was used for week-end pleasure trips around Detroit.

EARLY WORLD AIRPLANES

The early attempts to design and build heavier-than-air machines, referred to as airplanes, dates back as far as the year 1500. Reference is found to one Jean-Baptiste Dante, who towards the end of the 15th century made flights with a glider near a Lake Trasimene and in the city of Perugia. Glider

flights are also recorded for other dates. But it was not until 1891 that Otto Lillienthal made the first successful scientific flights with gliders. He carried out experiments with monoplane gliders near Berlin, Germany. In the United States, the Wright brothers began their experiments with gliders about 1900. These flights were later largely responsible for the first sustained man-carrying airplane flight on December 17, 1903, by them, at Kitty Hawk, North Carolina. Many others contributed much to the science of aeronautics. In 1891 Professor Samuel P. Langley of the Smithsonian Institute published his Memoir entitled, *Experiments in Aerodynamics*, which contained the results of his research on the resistance of planes. Professor Langley also experimented with model airplanes and on May 6, 1896, his steam-driven toy-model airplane flew over the Potomac River for a distance of over 3,000 feet, at a speed of 20 to 25 miles per hour. On June 22nd, 1896, Octave Chanute, assisted by A. M. Herring, and Avery, made experimental flights with gliders on the sand dunes near Lake Michigan. They developed the "Chanute Multi-plane Glider" and the "Chanute Bi-plane Glider."

EARLY MICHIGAN AIRPLANES

The first glider made in Michigan was built by Charles Augustine of Traverse City, Michigan, in the early part of 1909. The first flight in this glider was made on the Ransom farm near Arbutus Lake, a few miles out of Traverse City. Augustine tried to make the first flight, but was too heavy, and the glider came down quickly after it left the ground. The next attempt was made by Edwin Elton Smith, who flew the glider successfully. Smith is now 43 years old and lives at a summer resort at Arbutus Lake. The Smith flight was made on October 17, 1909, and was described in detail in the newspaper, *'The Record Eagle'* of October 18, 1909. The account states, "The glider shot upward about 50 feet, then settled gracefully, almost like a bird would come down to the ground. The plane

hardly jarred. The flight was about six hundred (600) feet long and its only impetus was four men who pushed it off."

The Augustine Glider is described as being about 20 feet long and of double-deck construction. The double-deck probably refers to a bi-plane.

Satisfied with the success of the flight of this glider, Augustine decided to build a larger one of the monoplane type and to equip it with a gasoline engine. This airplane was completed in the summer of 1910. It was equipped with an old eight cylinder Holmes engine which had been rebuilt for this airplane by William A. Campbell, Chief Engineer of a basket factory which was located in Traverse City. The engine developed some trouble on starting and blew off a cylinder. The airplane was exhibited at the Northern Michigan Fair during the fall of 1910 but never left the ground. Augustine built another airplane in 1911, but there is no record of it flying. Charles Augustine died on December 27, 1933, in the Annex Hospital, National Military Home, Los Angeles, California.

Augustine's airplane activities created a keen interest in airplanes among Traverse City business men. In September, 1911, Andrew Smith of Chicago brought a 16-cylinder airplane engine to Traverse City and demonstrated it on Boardman Lake by attaching it to a sled and lifting the sled on which 16 men were riding. The engine was equipped with a propeller eight feet in diameter. In 1911 Smith bought a standard Bleriot airplane in which he demonstrated his engine. In June, 1911, he filed articles of incorporation at Lansing for the Smith Airplane-Engine Company, capitalized at \$100,000. In November, 1911, Smith engaged Vandie Ludvia, of the American Airplane Company of Chicago, as a pilot to demonstrate his engine at Traverse City. While landing from one of his flights, on Thanksgiving Day, 1911, he struck a stump and his plane was wrecked. The following year his company went out of business.

The early airplane manufacturing efforts in Michigan were not centered only around Traverse City. In Detroit, plans

were under way for airplane construction as early as 1908. In this year the Aero Club of Michigan was organized in that city and discussed plans to center the aircraft industry in Detroit. The first records, however, of actual construction of an airplane in Detroit date back to April 8, 1909, when Andrew Cuthbertson exhibited his machine at the plant of the Michigan Steel Boat Company. Mr. Cuthbertson was an engineer with this company and built his machine at their plant. He originally made his home at Algonac, Michigan. It is understood that the airplane was flown but was later wrecked. He built another airplane in 1910. There are no records of any flight with it. These developments in Detroit were followed rapidly by others. In 1910, G. E. Miller, better known as "Square-Deal Miller", the Grand River Avenue jeweler, and former nationally known bicycle racer, conceived the plan to build an airplane. Herman Schmidt was associated with him in the capacity of engineer. The plans for the machine were completed in 1910 and the actual construction began in early 1911. The airplane was of the Curtiss type and was made with a great number of parts which were purchased from the Curtiss Airplane Company of New York. The machine was built in a barn at Grosse Pointe Shores and made its first and only flight on October 15, 1911, from a field on the P. A. Grainger farm. The motor stopped after a few minutes of flying and in landing, hit a fence and was wrecked. Later, it is understood, Miller entered into an agreement with another pilot, who owned an airplane, to fly the first air-mail in Michigan. They successfully delivered a letter from the Mayor of Detroit to the Governor at Lansing. This airplane was later wrecked during an exhibition flight in Lansing.

The years 1910 and 1911 were eventful ones in Detroit Aviation. Several airplanes were purchased and flown. Russell A. Alger, one of the organizers of the Wright Airplane Company, brought one of the first planes produced by this company to Detroit in June, 1910. The machine was a bi-plane and is believed to be the first successful one in this locality.

After many successful flights, with Frank Coffyn as pilot, the owners decided they would experiment with the machine on the Detroit River. They conceived the idea of a hydroplane and converted their bi-plane into this type by equipping it with pontoons. The experiments with pontoons were unusually successful and proved that safe landings were possible on water with this type of aircraft. Thus, the credit for the first seaplane is due to Russell and Frederick Alger. The first landing on water, however, was made by Glenn Curtiss, on Lake Kauka, Hammondsport, New York, in June, 1910. Curtiss, however, made his flights in a flying boat of the hull type, while the Algers made theirs with pontoons. On June 19, 1911, Mrs. Russell A. Alger, Jr., made a flight at Detroit in the Wright machine owned by the Algers and achieved the distinction of being the first woman in Michigan to fly in an airplane. Another airplane owner in Detroit in 1911 was James D. Coney, who bought his machine in New York from Henry Charles Cook. This airplane was flown from LaSalle Gardens in Detroit and is understood to be one of the first privately-owned airplanes in Michigan. In 1912 William E. Scripps purchased a Burgess-Wright hydroplane and achieved the distinction of being the first Detroitier to own and pilot his own plane. This machine had been built under the Wright patent. It was powered with a Sturtevant motor of 25 h.p. and was equipped with two chain-driven pusher propellers. A high-speed of 45 m.p.h. was possible. The first flight was made by Scripps on September 10, 1912. In addition to pleasure-flying, this airplane was also used to carry newspapers to the Flats of Lake St. Clair.

During the early period of the development of aviation in Michigan, a large number of 'cracker-box' contrivances made their appearances in back yards and barns, but none achieved much success or even went beyond the stage of the first flight. However, there are some worthy of mention. In May, 1910, John Buchanan, of Holland, Michigan, designed an original

type airplane which he claimed was impossible to over-turn. In July, 1910, Walter L. Marr, of Flint, Michigan, and one of the designers of the Buick automobile, constructed a bi-plane of his own design. This airplane did not fly in Michigan, but made a number of successful flights in Denver, Colorado. In September of the same year, N. E. Brown, a photographer of Grand Haven, Michigan, made an actual flight with an experimental power-driven heliocopter of his own design. The machine was equipped with a 15-h.p. Elbridge motor and was wrecked on its first flight. Janes' book of *All the World's Aircraft* for 1912 lists several Michigan airplanes which are worthy of consideration and will be discussed further in the pages on Manufacturing. At Saginaw, Michigan, there was C. C. Brooks, who, in 1911, built airplanes of the Bleriot type, equipped with the 70 h.p. Gnome motor. Lionel H. De Remer, of Bay City, Michigan, and one of the first licensed pilots in this state, was the test pilot for the Brooks Manufacturing Company.

In August, 1911, the Kirkbride bi-plane, built by William Kirkbride, made its appearance. It is described as having a span of 30 feet, a length of 35 feet and weighed 595 pounds without pilot. It was equipped with a 40-h.p. Max-motor, which was made in Detroit.

In 1911 there was also the Schmitt Biplane of the Curtiss type equipped with a 40 h.p. Elbridge motor. The Swainhardt Biplane of Detroit is also listed for 1911, but no additional details could be found on this airplane.

Progress of this kind went on throughout the state of Michigan but it was not until the World War of 1914-1918 that airplanes were built in quantity in this state.

PIONEER MICHIGAN PILOTS

In addition to its pioneer airplane pilot-designers, Michigan also had some very prominent men who made flying their vocation and became known nationally and internationally. In

this group of pilots was a man from Muskegon, Michigan, who was known to his friends as "Bud" Mars. His right name was James D. McBride, a son of Thomas McBride, a veteran lake captain. He adopted the name of Mars when he took up circus life. This occurred previous to his flying activities.

Mars took up flying in 1909 and during the Alaska-Yukon exhibition of that year, he established a record for the continuance performance of a dirigible balloon. He piloted his craft over a four-mile course 24 times in three days. It was after these flights that Mars became acquainted with Glenn Curtiss who convinced him of the possibilities of the airplane.

Mars learned to fly heavier-than-air machines on the ice at Sheepshead Bay, New York. He became associated with Curtiss and appeared in Curtiss planes at state fairs and flying exhibitions throughout the country. He established an enviable record. He made the first flight in the Orient in 1910. Accompanied by Captain Thomas Baldwin and a group of American flyers, he made a tour of the world in 1909, giving exhibitions in all the principal countries. The trip took seven months. He staged auto-plane races with Barney Oldfield and engaged in many other daring feats. Mars retired from flying in 1915. One of his final flights was in Michigan, his home state. When the war came, Mars accepted a commission in the air service in 1917 and became an instructor and accompanied the first two American air units to France. He saw no active service. Today he is associated with an eastern airplane factory. Mars held the Aero-Club of America Aviator's Certificate No. 11.

Lionel H. De Remer, licensed aviator No. 115, was another of Michigan's famous pilots. De Remer soloed on April 13, 1912, at Nassau, New York, in a Wright biplane and thus qualified for the license. Later that year he became test pilot for the C. C. Brooks Manufacturing Company of Saginaw, Michigan, and did exhibition flying in Michigan cities. On February 13, 1913, he established a record at Corpus Christi by staying up two hours and forty-one minutes with J. C.

Curran, of Saginaw, and J. W. Augenbaugh, of Waseca, Minn., as passengers in a Wright Hydro-plane.

He conducted a flying school and general airplane business in Bay City, Michigan, his home city. He was exempted from war service because of eye trouble. De Remer is now associated with a radio station in Bay City.

Eugene Heth, better known as "Dare Devil" Heth, is another of our pioneer pilots who was born in Michigan. He learned to fly in 1910 and flew the old type Pusher airplane in almost every section of the United States. He continued his flying activities up to the time of the World War. He is now retired and living on a farm outside of Pontiac, Mich.

There were no doubt many other pioneer pilots who were born in Michigan and others born outside of Michigan who were very active in the early aviation activities in this state. A number of these are listed under the heading of Early Birds given below. A description of the activities of those born outside the State of Michigan will also be found in this section.

A number of names have been presented of pilots who were born in Michigan and who it is claimed were active in the early aviation events in the United States. It has, however, up to the time of this writing been impossible to obtain exact information on their careers, and because of this difficulty a description of their activities has been omitted from this article.

Edward A. Stinson. In reporting the early aviation activities in the State of Michigan especially after the World War, one cannot omit the name of Edward A. Stinson, better known to all pilots and airplane manufacturers as "Eddie". To Stinson perhaps more than any other man should go the credit for reviving both the flying and aviation manufacturing activities in Michigan. All those associated with aviation during the period immediately after the World War, particularly about 1920 and 1921 know of his activities as a test pilot for Michigan-made airplanes and his introduction of flying in cabin type airplanes through the use of the Junkers J L-6. In 1925 he organ-

ized the Stinson Aircraft Corp. (See Section on Manufacturing.)

Stinson was born in Fort Payne, Alabama. He learned to fly in 1911 and flew continuously up to the time of his death on January 26, 1932. It has often been stated in flying circles that he had perhaps flown more hours and trained more pilots than any other man. He served as flight instructor during the World War and held the rank of 1st Lieutenant in the U. S. Air Corps. It is said in aviation circles that he was the first to discover how to recover from an airplane tail spin.

E. A. Goff, Jr., was born in Battle Creek, Michigan, and began to teach himself to fly in 1911, using Glider and Pusher type planes. He continued these activities until 1915. Later he enlisted in the United States Army Air Corps and graduated from their training school at Souther Field, Americus, Georgia. His first solo flight was made in a Glider in 1911.

Mr. Goff known in Flying circles as "Pete" has had a very wide experience in flying all types of military aircraft, as well as most modern commercial aircraft. He has continued his interest and activities in aviation up to the present time and is now manager of the Kellogg Airport at Battle Creek, Michigan. His activities include charter membership in the National Aeronautical Association, membership in the Quiet Birdman and the Early Birds.

William E. Scripps was born in Detroit and learned to fly at Detroit in 1912. Walter Brookins, who was the first man whom the Wright Brothers taught to fly, acted as Mr. Scripps instructor. Burgess and Curtiss Airplanes of 1912-13 design were used for training purposes.

Mr. Scripps is credited with having made the first night flight on November 3, 1913. According to the account of this flight Scripps took off from the Detroit Motor Boat Club and developed motor trouble while circling over Grand Circus Park. The airplane was landed in the River and repairs were completed just at dark. Scripps set out to taxi the ship down the river and Lake St. Clair to the Club. As it got

darker he feared that he would strike a boat so he took off and successfully landed at the Club, thus it is believed occurred the first night flight in America.

Mr. Scripps has been very active in promoting aviation in the State of Michigan and was one of the first to own an autogiro (1932-33). He is the past president of the Early Birds and a member of the Detroit Aviation Society and a former member of the old Aero Club of America (see also section under Early Michigan Airplanes for additional information of Mr. Scripps' activities).

THE EARLY BIRDS

The Michigan Section of the Early Birds has included in its membership some of the most prominent pioneer pilots of the United States. Several of these pilots were born in Michigan and received their flight training in this State. Many of the successful pioneer aviation activities can be traced to their efforts.

The membership of this group arranged in alphabetical order is as follows:

Carr, Walter J., was born in Ladd, Ill., and at present is living in Saginaw. He learned to fly near Chicago about 25 years ago (1912) and has been active as a mechanic, pilot and airplane designer since that time. He has acted as a test pilot for airplanes of his own design as well as airplanes designed by others. He has served as a transport air pilot both in the United States and China and has built up a splendid reputation as an airplane pilot and operator. During the War he served as an instructor for the U. S. Air Corps.

Copland, Harry DePew was born at Cambridge, Mass., and learned to fly at Detroit, Michigan, on the old Curtiss Pusher type airplanes. He received his first flying training in 1911 and is credited with having flown most of the old type Curtiss, Wright, Bleriot and other early airplanes in addition to practically all types of modern commercial and military airplanes. During the World War (1917) he served as an instructor in

the British Royal Flying Corps. It is claimed that he flew the first British Mail route across the North Sea.

Mr. Copland has continued his interest and activities in aviation and at present holds the rank of Captain in the United States Air Corps Reserve and also holds the United States Dept. of Commerce transport pilots license and an A. & E. Mechanics license.

His interests have also lead him into radio and he holds a radio operators license.

This experience in both flying and radio makes him admirably suited for his present position as Director of Traffic Control at the Wayne County Airport, for the Bureau of Air Commerce, Department of Commerce.

In addition to membership in the Early Birds, Captain Copland is also a member of the Quiet Birdman, The Institute of Aeronautical Science, The National Aeronautical Association and a member of other organizations active in the field of aviation and radio.

DeRemer, L. H., Bay City, Michigan. See description above.

Goff, E. A., Battle Creek, Michigan. See description above.

Hallett, Geo. E. A., Birmingham, Michigan. Hallett was in charge of all aircraft engine instruction work for the United States Army Air Corps during the War. He wrote a number of instruction manuals which were used in the various Air Corps mechanic schools throughout the country. He has had a very active career in aviation and in particular in the engine development field. He is now associated in an engineering capacity with the General Motors Corp.

Mr. Hallett was born in Cheltenham, England, May 9, 1890, but was educated in California where he attended public school and compiled a number of home study courses. He worked with the Curtiss Aeroplane and Motor Co. from 1911-1914 as an airplane and engine mechanic and later as an engineering expert. In 1911 and 1912 he traveled through Russia, Germany and France for the Curtiss Co.

In 1914 he served as the American pilot on the Wanamaker-Curtiss Transatlantic Aeroplane "America". From 1916-18 he held the position of civilian aeronautical-mechanical engineer in the U. S. Air Service and the position of Major from 1918-20.

Heth, Eugene, Pontiac, Michigan. See Description above.

Hoover, Frederick A., Detroit, Michigan. Although not born in the State of Michigan, he was very active in the pioneer aviation activities in this State. In the summer of 1912 he made a number of barn-storming flights at Hillsdale and Adrian. He used a Curtiss type Pusher Airplane which he built himself.

His next activity was testing liberty engines which were built in Detroit, and installed in the DeHaviland type airplanes during the period of 1918. He was transferred from McCook Field, Dayton, Ohio, for this work. In January, 1919, he became test pilot for the Packard Motor Car Company of Detroit and remained in this position until 1924. Mr. Hoover ended his active work in aviation in 1924, but he has remained in Detroit and has shown a keen interest in all aviation developments.

James M. Johnson, Ferndale, Michigan, was born in Helena, Ark., and learned to fly at the Curtiss Aviation School at North Island, Calif., in 1914. He became an instructor at their school in 1915 and held this position for one year. He was then transferred as an instructor for the Curtiss school at Newport News, Virginia, where he stayed until 1917.

After leaving Curtiss he served as a test pilot for the United States Government at Langley Field from the period of June to October, 1917, and then as a test pilot at McCook Field from October, 1917, to July, 1920. He was later employed as a test pilot for commercial airplanes and held the position of the president of the Johnson Flying Service and vice-president of the Johnson Airplanes and Supplies Company up until May, 1925.

In 1915 he received certificate number 329 from the Aero Club of America and he obtained expert aviators certificate number 78 from the same organization.

His latest activity in aviation was with the Verville Airplane Corporation. Previous to that he served as an aircraft inspector for the United States Department of Commerce.

Lees, Walter E., Ferndale, Michigan, was born at Janesville, Wisconsin, and has been very active in aviation activities in the State of Michigan. He received his flying training with the Bendist Aircraft Company at St. Louis, Mo., in 1912, and later took additional training at the Curtiss Training School at San Diego, Calif., in 1914.

He was a civilian flying instructor from 1915 to 1917 and instructor and test pilot from 1917 to 1918 in the United States Army Air Corps. He served as a commercial pilot from 1918 to 1920 and in this capacity was the test pilot for the Stout all metal Commercial Airplanes, in 1924.

In 1925 he joined the Packard Diesel Division of the Packard Motor Car Company as test pilot and held this position until 1932. In 1931 he established a world aviation endurance record of 84 hours and 32 minutes, flying a Detroit built diesel powered airplane.

Mr. Lees is now a sales engineer in the Detroit office of the Scintilla Magneto Company.

His activities also show membership in the Quiet Birdman and the Caterpillar Club.

Pawlowski, Felix W., Ann Arbor, Michigan, was born in the vicinity of Warsaw, Poland, and now holds the chair of Gugenheim Professor of Aeronautics at the University of Michigan.

Professor Pawlowski learned to fly in a homemade airplane while he was at the University of Paris in 1910 at a field near Issy-Lis-Moulineaux.

He came to the United States about that time and since January, 1913, has been teaching aeronautics at the University of Michigan.

Professor Pawlowski holds the degree of Doctor of Science and the professional degree of Aeronautical Engineer.

During the World War he served as an aeronautical engineer for the United States Army War Dept. in Washington, D. C.

Rankin, Alex, Wayne, Michigan, was born in Frostberg, Maryland, where he received his first flying training as early as 1916. He came to Michigan in 1926 and joined the Stinson Aircraft Corp. and has been associated with this company as chief inspector up to this date.

He has had a considerable amount of experience in both designing and building of aircraft and has built several airplanes which he has flown both as test pilot and in general routine operation.

Wright, Roderick M., Wayne, Michigan, was born at Washington, Indiana, and first learned to fly in 1913 with the Wright Brothers at Dayton, Ohio.

After completing his training he obtained the Aero Club of America license number 254.

Grover Loening who was then with the Wright Brothers instructed him. In 1914 Mr. Wright came to Detroit with one of the Wright Brothers flying boats in an attempt to interest Wm. E. Scripps in the purchase of it, but had to leave Detroit without making the sale. He flew the boat back in June, 1914, down the river to Toledo, at an altitude of what he estimated to be 2,000 feet.

Mr. Wright did not return to Detroit until October, 1928, and in 1929 became associated with the Stinson Aircraft Corporation as a test pilot. He held this position until 1930 and then joined the Air Service of the Ford Motor Company as a pilot on their freight line, where he stayed until 1931. In 1932 he took a job as test pilot for the Hudson Motor Car Company of Detroit and at the end of that year retired from active work in aviation.

OTHER PIONEER MICHIGAN PILOTS AND DESIGNERS

As we go through the list of pioneer pilots, designers and manufacturers given in *Who's Who in American Aeronautics* we find many who were born in the State of Michigan and who have contributed much to the development of aviation in this country. Because of the limited space available for this article only a very brief description of their activities is given here and only those who were active prior to 1917 are included. For additional information and the names of those active after 1917 the reader is referred to any good book on *Who's Who in Aeronautics*. Also see other sections in this article.

Bakcock, Bearne Clifton, was born in Benton Harbor, Michigan and from 1909 to 1914 did exhibition flying with Bakcock and Breininger Aeroplane Co. of Seattle, Wash. From there he went with Glenn L. Martin Co. and from 1917 to 1918 he was with the National Training Corps, of Detroit. Bakcock is an aeronautical engineer and has been associated with a number of prominent aviation activities.

Boeing, William Edward, was born in Detroit, Michigan and received his early flying instruction under Glenn L. Martin at Los Angeles, California. He organized the Boeing Airplane Company and the Boeing Air Transport, Inc. and has been one of the most active and prominent airplane manufacturers in this country.

Driggs, Ivan Howard, was born at Lansing, Michigan and received his technical training at Michigan State College. (See also section on Manufacturing). He built his first airplane in 1915 and has held a number of responsible engineering positions in the aviation industry. He organized the Driggs Aircraft Corp. at Lansing, Michigan in 1927. He is at present with the Glenn L. Martin Co. at Baltimore, Md.

Gates, Ivan R., was born at Rockford, Michigan. It is understood that he began to make experimental airplanes and flights with pusher type biplanes in 1911. In 1912 with the services of Didier Masson, a French pilot, he built the Masson-Gnome

biplane and made a number of exhibition tours throughout the country. From 1921 to 1927 he was general manager of the Gates Flying Circus and Aviation Co. and it is claimed that the company operated in 44 states, in general exhibitional and commercial aviation.

Gott, Edgar Nathaniel, was born in Detroit, Michigan, attended the Detroit University School and the University of Michigan. He received his B.S. degree in 1909. From 1915 to 1922 he was General Manager of the Boeing Airplane Co., Seattle, Wash. and later became president. He has been very active in executive work in the aircraft industry.

Seely, Lyman J., was born in Detroit, Michigan, received his college training at the University of Rochester. He joined Glenn H. Curtiss as sales and publicity manager for the Curtiss Aeroplane and Motor Co. early in the days of aviation activity and held this position until 1917. He purchased the Curtiss Hammondsport plant in 1919 and organized the Keuka Industries, Inc. Later he became editor of the Steuben News, Inc. at Hammondsport, N. Y.

Verville, Alfred Victor, was born in Atlantic, Michigan and joined Glenn H. Curtiss at Hammondsport in 1914 as an engineer. From 1915 to 1918 he held engineering positions with the Aeromarine Co., Thomas Airplane Co., General Airplane Co., Detroit and the airplane division of the Fisher Body Company. In 1918 he joined the engineering division of the U. S. Air Corps, where he stayed until 1925 and was responsible for a number of interesting and successful military designs. While in the Air Corps he designed the winning airplanes in the Pulitzer Races of 1920 and 1924. He was a member of the Lockhart Mission to France in 1918 and a member of Brig. Gen. Mitchell's Mission to Europe in 1922. After leaving the Air Corps he became active in airplane manufacturing in Detroit. (See Section on Early Airplanes and Manufacturing).

Waldon, Sidney Dunn, was born in London, England, but early in life took an active part in Michigan aviation. In 1916 he helped buy an airplane and helped in the training of Michi-

gan National Guardsmen at Grayling, Michigan. He is a charter member of the Aero Club of Michigan. He made his first flight as a passenger in a Wright airplane in 1910. In 1916 he enlisted in the U. S. Army and held the rank of Captain in the Aviation Section of the Signal Corps in 1917, and the rank of Colonel in the Air Corps in August of the same year. Since leaving the Army in 1919 he has been active in engineering and executive work in Detroit. (See also section on Early Michigan Airplanes).

Waterhouse, William James, was born in Galien, Michigan. He designed, constructed and flew a light weight monoplane in 1909 and made exhibition flights. He is a graduate in civil engineering and held a number of responsible engineering positions including the offices of Ass't. to Dr. A. F. Zahm, Chief of the Research Dept. of the Curtiss Aeroplane and Motor Corp., at Hammondsport and Buffalo, N. Y., (1915-16) engineer U. S. Air Corps, McCook Field (1917), chief engineer, Standard Aircraft Corp. (1919), President, Waterhouse Aircraft Inc. (1925), consulting engineer at Hollywood, Calif. (1928) etc.

MICHIGAN MEN IN MILITARY AVIATION

The State of Michigan can boast of a number of high ranking officers in the various divisions of the Army and Navy. In the group are included the following arranged in alphabetical order. For additional information see the Army and Navy Register or Who's Who in Aeronautics.

Clagett, Henry Black, Colonel, Air Corps, born Ft. Wayne, Mich., at present Commandant, Selfridge Field, Mich.

Harvey, Lloyd L., Major, Air Corps, born Allegan, Mich., 1916 to 1917 civilian aviator, 1917 to date U. S. Air Corps.

Raby, James Joseph, Commander, Navy Department, born, Bay City, Michigan. 1923 to 1926 Commandant, Naval Air Station, Pensacola, Florida, Commander, Aircraft Squadrons Scouting Fleet beginning Sept. 1926.

Royce, Ralph, Colonel, Air Corps, born Marquette, Michigan. Student Signal Corps Aviation School 1915 to 1916 at San

Diego, Calif., pilot, 1st Aero Squadron in Mexico at border base from March, 1916, to April, 1917. Has held many important positions in U. S. Army Air Corps, including the office of Commandant at Selfridge Field, Michigan.

Squier, Owen George, Major General, U. S. Army, Retired, born, Dryden, Michigan. In charge U. S. Army Air Corps from June 1916 to May 1918. Has held a number of important positions in the U. S. Army since graduation from the U. S. Military Academy in 1887.

Westover, Oscar, Brig. General, Chief U. S. Air Corps, born, Bay City, Michigan. Graduate U. S. Military Academy, U. S. Army Balloon and Airship School and the U. S. Flying School. Won the National Elimination Free Balloon Race at Milwaukee, Wis. in June 1922 and represented the U. S. Army as pilot in the International Balloon Race at Geneva, Switzerland in August 1922. Has held a number of important executive offices in the U. S. army, including such positions as officer in charge, Signal office, Port of Embarkation, Hoboken, N. J.; Officer in charge Storage and Traffic Dept., Bureau of Aircraft Construction, Executive, Bureau of Aircraft Construction; Chairman, Air Corps Claims Board; Chief, Ballooon and Airship Division, O.C.A.S., Commanding Officer, Langley Field; Commandant of the Air Corps Tactical School and many similar positions.

EARLY AIRPLANE MOTORS

With the success of flying assured, engineers in America and Europe turned their attention to designing airplane engines. Many types were built for both experimental purposes and for amateur airplane builders. The first successful airplane engine in the world was designed by Charles M. Manly, of Washington, D.C., in 1901, for Professor Langley's experimental airplanes, and with the possible exception of the Forest engine of 1888, it was also the first successful radial engine. The Manly engine is now in the Smithsonian Institute at Washington. This en-

gine developed 52.4 horsepower at 950 r.p.m. and weighed 124 pounds.

Aircraft motors began to appear in Michigan at an early date. The first recorded developments took place in 1910 and 1911 in Detroit.

During this period, Fred Weinberg, a consulting engineer in Detroit, designed and built the Detroit Aero Engine. This was a two-cylinder, air-cooled horizontal type rated from 25 to 30 horsepower at 1500 r.p.m. It is claimed that a large number of these motors were sold to amateur airplane builders throughout the country.

Another Weinberg product was the Albatross engine, built in 1910 and 1911, and is believed to have been the first six-cylinder fixed radial engine built in America. The engine developed 50 horsepower. He also designed the 'Michigan' motor, an experimental two-cylinder rotary two-cycle motor.

Another group active in the airplane engine field was the Detroit Aeronautic Construction Company, which in 1910 and 1911 built the Aeromotor. This engine was built in two types. These were four and six cylinder vertical water-cooled engines which developed 30 and 75 h.p., respectively. The name of Aeromotor was changed to Maximotor in July, 1911.

Maximotors, headed by Max Dingfelder, turned out three types of aircraft motors. Two of the types were four and six cylinder vertical water-cooled engines. The four cylinder engine was rated at 50 h.p. at 1200 r.p.m. and weighed 210 pounds. The six cylinder engine developed 75 horsepower at 1200 r.p.m. and weighed 340 pounds. The third type was an eight cylinder Vee type of 115 horsepower at 1600 r.p.m. and weighed 420 pounds.

In May, 1911, the Wolverine Aeronautic Company, of Albion, Michigan, announced the manufacture of an aircraft motor of 25-30 h.p. at 1000 r.p.m. The weight was 130 pounds. This company also made propellers and airplane parts.

Others who announced airplane motors in 1911, were the Michigan Airship Company, who built a two-cylinder rotary

motor of 30 to 40 horsepower which weighed 110 pounds; the Buick Motor Company, of Jackson, Michigan, which built water-cooled motors and the General Machinery Co. of Bay City, which announced their first motor in 1910.

In addition to complete motors, many engine parts were made in Michigan. Noteworthy of these was the manufacture of the crankshafts for the Curtiss and Wright motors by the Anderson Forge & Machinery Co. of Detroit. This work was begun in the summer of 1910.

In 1914 and 1915, the Van Blerck Engine Company of Monroe, Michigan, built experimentally, two types of water-cooled Vee-type motors of eight and 12 cylinders, which developed 135 and 185 horsepower, respectively.

In 1916 and 1917, the Kessler Motor Company of Detroit designed and built several six-cylinder vertical water-cooled supercharged engines. This engine was operated on the ordinary four-stroke cycle, but at the bottom of the intake stroke the piston uncovered ports through which a quantity of air was forced under pressure into the combustion chamber. One of these engines was rated at 200 horsepower at 2400 r.p.m. and employed a propeller reduction gear. Both the U.S. Army and Navy were interested in this development.

The Packard Motor Car Company of Detroit also played a leading part in the early airplane developments in Michigan. Their activities in this field are discussed in the pages on Manufacturing.

II

AIRLINES

THE growth of the commercial airlines in the United States has been very rapid since the enactment of the Air Commerce Act in 1926. The number of passengers carried increased from 5,782 in 1926 to 952,024 passengers in 1937 (first ten months). The distance flown daily has increased from 11,830 miles in 1926 to over 210,584 miles in 1937. In all this development Michigan has played an important rôle. References have

been found of experimental passenger and air mail flights between cities in Michigan as early as 1911, when G. E. Miller, with a hired pilot and airplane, delivered a letter from the Mayor of Detroit to the Governor at Lansing. Another reference has been found to the activities of the Patterson Aviators, who carried mail by air during the Sixty-sixth Michigan State Annual Fair, September 6-15, 1915.

What is claimed to have been the first commercial freight service between two cities in the State of Michigan took place on August 1, 1919. On this date, the Thompson Airplane Company inaugurated its service from Detroit to Lansing and Saginaw by carrying about 200 pounds of automobile parts for the Demmer Auto Company of Detroit. The flight started at Morrow Field, Detroit. The trip to Saginaw was made in two hours. Jack Thompson was president of the company. Their earnings were low and the Thompson Airplane Company soon went out of business. On August 29, 1920, the U. S. Aerial Express Company began operations between Detroit and Cleveland. They carried passengers and freight. Large 21-passenger Aeromarine Flying Boats were used for this service. Thomas F. Dunn was president of the company. This firm only operated for a very short time and went out of business in 1920, the same year in which they were organized. Attempts at commercial airlines of this kind continued until 1925. In that year a Stout all-metal airplane made by the Ford Motor Company and christened the "Maiden Dearborn" carried the first official air mail from Detroit to Cleveland under the auspices of a private concern.

STOUT AIR SERVICES, INC.

✓ In 1925, after the sale of the Stout Metal Airplane Company to the Ford Motor Company, the original stockholders of the first company joined with Mr. William B. Stout to form the Stout Air Services, and on August 1, 1926, made their first scheduled daily round trip flight between Detroit and Grand Rapids. This is believed to be the first successful strictly pas-

senger schedule airline operation in the United States. Their initial airplane equipment consisted of three eight passenger, all-metal Stout airplanes powered by Liberty motors.

During the early part of 1927 additional equipment was purchased, and with this equipment they inaugurated a new passenger line from Detroit to Cleveland. The first scheduled flight on this line was made on November 1, 1927. The successful operation of these lines lead to the extension of their airline service and on November 1, 1928, they opened their Detroit-Chicago schedule. Their equipment now consisted of both single and tri-motored Stout, all-metal airplanes.

Stout Air Services Inc., flew about 350,000 miles and carried over 125,000 passengers during the period of August 1, 1926 to August 31, 1930. One of the outstanding achievements of the company was the carrying of this number of passengers without injury of any kind to any of them.

In 1929 the control of Stout Air Services, Inc., was purchased by the United Aircraft and Transport Corporation of New York. On September 1, 1930, its services were merged with those of National Air Transport, and later both were made a part of the United Air Lines. This company now operates a coast-to-coast passenger, air-mail and express service.

THOMPSON AERONAUTICAL CORPORATION

(Trans-American Airlines Corporation)

On July 14, 1927, a group of Cleveland businessmen organized the Thompson Aeronautical Corporation to operate a passenger air-mail and express airline between Detroit, Pontiac, Muskegon, Bay City and Chicago. Later they established operating headquarters at the Pontiac Municipal Airport, and extended their lines to include Saginaw, Flint, Lansing, Kalamazoo, Grand Rapids, Ann Arbor, Jackson, Battle Creek, South Bend and Toledo. Their original equipment consisted of Stinson planes, made in Detroit, Michigan.

In 1929, they established the first scheduled amphibian service in the United States by their airline from Detroit to Cleveland. The flight to Cleveland was made in 55 minutes. The amphibian type of airplanes permitted them to fly directly across Lake Erie.

About 1931 they changed their name to Trans-American Airlines Corporation, with a view to extending their service across the continent and even to Europe. In 1931 and 1932 they conducted the first survey of a northern route to Europe from Detroit by way of Greenland.

In 1933, Trans-American Airlines Corporation merged with American Airlines and R. C. Marshall, president of Trans-American became manager of the Eastern Division for American Airlines. The Eastern Division now operates passenger, air-mail and express service from Detroit to Chicago, Buffalo and New York and intermediate points. The company inaugurated an airplane sleeper service on its eastern route early in the summer of 1934. Present equipment consists of Douglas, Curtiss Condor and Stinson Model A airplanes. The Detroit City Airport is their Detroit Base of operation. Headquarters are in Chicago. The company has established an excellent record of safety and service in its operation.

KOHLER AVIATION CORPORATION

In September, 1929, the Kohler Aviation Corporation established an amphibian airline service between Detroit, Grand Rapids, Muskegon and Milwaukee. The use of amphibian airplanes enabled them to fly directly across Lake Michigan and thus save considerable time over the other routes and methods of travel. They used Keystone-Loening amphibians and carried passengers, mail and express. In 1934 the company merged with the Pennsylvania Airlines, Inc., and is now operating as a subsidiary of the latter company. The route is the same. The Detroit City Airport is their principal Michigan base.

CENTURY AIRLINES

The Century Airlines was organized as a division of the Cord Corporation under the direction of E. L. Cord and L. B. Manning. Plans were laid for this company in 1930 and the first scheduled operations took place in March, 1931. Their lines operated with Detroit as a center and radiated to Chicago and Cleveland. The equipment consisted of Stinson Model T Tri-motor airplanes. A special feature of this airline was the attempt to operate without airmail contracts and at fares equal to those of the railways between the same points. The company had unusual success in this operation. Competition became so keen between them and Trans-American that they were later absorbed by this company. It is interesting to note that Trans-American is now a division of American Airlines in which the Cord Corporation have a large interest.

NORTHWEST AIRWAYS, INC.

Although this company does not operate from Detroit, it is interesting to know that it was organized and largely financed by Detroit businessmen, headed by Harold H. Emmons. Mr. Emmons became its first president. The original equipment of this company consisted of single motor Stinson Airplanes, made in Detroit. The first route was from Chicago to Minneapolis and St. Paul. They now operate the Northern Trans-continental Route from Chicago to Seattle.

INCOMING AIRLINES

Several airlines enter Detroit from other sections of the country. Central Airlines terminate at Detroit on their line from Washington. Pennsylvania Airlines also stop at Detroit on their route from Washington. These two airlines are now merged and are known as Pennsylvania-Central Airlines. They operate the route from Milwaukee to Detroit and Detroit to Washington. In addition, schedule connections are main-

tained with all the major airlines of the country, most of whom maintain ticket offices in Detroit and other Michigan cities.

NON-SCHEDULED OPERATIONS

There are a number of operators throughout the State of Michigan, who offer non-scheduled flights to any section of the state or country, at reasonable rates. The Stinson-Air-cab Association is made up of non-scheduled airplane operators throughout the country who offer this type of service. The headquarters of this organization is at Wayne, Michigan. They are represented in Michigan by the Maycock Flyers, who have their headquarters at the Detroit City Airport, and who hold the first membership card in this association. Maycock Flyers claimed to have started operations in March, 1919, on a very small scale and are thus one of the oldest existing flying services. They have established a very fine record for service and safety. Their present equipment consists of two Stinson Reliant cabin airplanes. In June, 1934, they pioneered a special charter service to Mackinac Island. William B. Maycock is president of the company.

Knowles Flying Service at the Detroit City Airport has also established a fine record of local air-taxi flying and charter-service. In Northern Michigan, the Hammond Flying Service of St. Ignace have been operating for some time with a considerable degree of success. There are numerous other operators of this kind throughout Michigan who are doing their part to keep this state in the front ranks of commercial airplane operations.

PRIVATE PLANE OPERATION

Michigan ranks among the pioneer states in its private plane operations. Michigan rates as the fifth state in the United States in the number of planes and pilots. On January 1, 1937, there were in this country 17,713 licensed pilots of all classifications, 8,890 licensed airplanes and 1,692 active unlicensed planes.

The use to which our private plane owners are putting their equipment covers many fields of activity. The majority of the owners own their planes for pleasure or sporting purposes only. Flying is an exhilarating and fascinating sport and many men, especially professional men, are taking up flying for the pleasure and the relaxation it provides. Many private owners are using their planes to commute to their favorite hunting or fishing camp in the northern part of the state, and it is believed that this use of the plane will increase materially as we develop additional fields up state, and add other navigation facilities.

A great number of private plane owners use their plane for instructing students, and rent their plane to qualified pilots on an hourly basis. This method provides the plane owners with an income to assist in carrying the now rather heavy operating expenses of such equipment.

The private airplane is also finding a very important place in business. William A. Mara of the Stinson Aircraft Corporation recently demonstrated that it is readily possible to cover a distance of over a 1,000 miles per day by airplane and transact business on the route. More businessmen and business establishments are using their private airplanes to speed up their business trips. Gar Wood, the famous speed boat racer, owns two airplanes which he uses for business and pleasure. Colonel Jesse Vincent of the Packard Motor Car Company and Mr. F. S. Spring, of the Hudson Motor Car Company, both use their private airplanes for business and pleasure. There are many others in the state who have found the use of a private airplane advantageous in business.

The newspapers of the country have made good use of the air plane in their business. The *Detroit News* has been one of the outstanding private operators in this field. In 1912 William E. Scripps, president of the *Detroit News*, was one of the first in the country to carry newspapers by airplane in his privately owned hydroplane.

In August, 1929, the *Detroit News* purchased a high speed Lockheed Airplane for use in photographic and news collection work. Many excellent aerial photographs were taken from this airplane by their photographer, Mr. Kuenzel. They established an excellent record with this airplane and in 1934 sold it to obtain a faster and more modern airplane from the Lockheed Company. This airplane was placed in service in the fall of 1934 with Mr. Piersol as pilot. In 1931 the *Detroit News* purchased the first commercial autogiro produced in this country. This aircraft was used in conjunction with their faster Lockheed airplane for special photographic and news collection assignments.

The other newspapers of Michigan do not have their own aircraft equipment. However, they make frequent use of airplanes, on a charter-basis, for special assignments.

AERIAL PHOTOGRAPHY

The aerial photographic business in this state represents a small but stable industry. The airplane provides the transportation for making such work possible.

In addition to the work of the *Detroit News* and other Michigan newspapers, the commercial work in this field has been in the hands of two companies who have been operating in Michigan for a number of years doing aerial photographic and survey work. Kalec, Inc., of Detroit have confined their activity primarily to the Detroit area, making surveys of real estate developments, highway project work, and factory sites.

The other company, Abrams Aerial Survey Corporation of Lansing, has done work in all parts of Michigan, as well as in many other parts of the United States. This company during 1930 made a photographic survey of Isle Royale, now a national park, located 60 miles off the coast of northern Michigan in Lake Superior. In the execution of this mission the Abrams Corporation made thirty-two trips across Lake Superior, travelling a distance of nearly twice the mileage of Lindbergh's over-water flight across the Atlantic. The assem-

bled mosaic map of Isle Royale, as now completed, is six feet wide by 24 feet long and contains 1,600 single exposures.

The Abrams Corporation have in their vaults over 100,000 vertical photographs used in the make-up of their aerial maps. In addition, they have over 20,000 oblique photographs of individual projects including state and county institutions, factories all over the state, grade separations, airports, bridges, harbors, ferry docks, etc., and have a great number of photographs of scenic beauty and historic interest of all parts of Michigan. They have in their files photographs of practically every city in the state with a population of over 1,000, and most villages down to 600 in population.

The work done by this company in the production of fine aerial maps has received the favorable comments of the U. S. Army, the U. S. Geological Survey Department and many individual experts in this line of work.

The Abrams Aerial Survey Corporation operates on an international scale. Important contracts outside the United States include the mapping of the entire Island of Puerto Rico in the West Indies, the mapping of the Firestone Rubber Plantations in Liberia, West Africa, and the mapping of the Matahambre mining section in the Pinar del Rio Province of Cuba.

It maintains offices and laboratories in Lansing, Detroit, Washington, D. C., and San Juan, Puerto Rico.

Besides doing aerial survey work, the company has developed and patented many important instruments used in connection with aerial surveys. One of the most outstanding is the Abrams Contour Finder which not only shows stereoscopic aerial photographs in relief but actually measures this relief very accurately. The instrument weighs only twelve ounces and can be carried by engineers into the field on their regular work.

As the need and necessity for special flying equipment developed, the corporation subsidized an Air Craft Corporation and built a special Stratoplane, known as the Explorer, for

high altitude aerial surveys. The new plane incorporates many features of special interest and value in aerial survey work.

III

AIRPORTS

AIRPORTS in the early days of aviation usually consisted simply of a smooth tract of land on someone's farm in the community. For exhibition flights, the race track or fair grounds were used as the landing field. Farm barns or large sheds served as hangars. Today Michigan can boast of approximately 130 licensed and 10 unlicensed flying fields. These consist of licensed airports, landing fields and emergency fields. Several of its airports rank with the finest in the world. A complete network of landing fields have been developed throughout the state to facilitate commercial and private flying. This work has been done largely by the Michigan Board of Aeronautics with the excellent support of the local communities. The Federal programs of aid since 1933 have helped materially to accelerate this splendid work. William B. Mayo, of Detroit, is chairman of the Board and Lieutenant Colonel Floyd E. Evans is director.

The first landing field which deserved the title of airport was not developed until the summer of 1917. This refers to Selfridge Field, which is located on the west shore of Lake St. Clair, 3 miles east of Mt. Clemens, Michigan and 22 miles northeast of the center of Detroit. The original development of this field is due to the foresight of Henry B. Joy, of Detroit, and former president of the Packard Motor Car Company. Even before the United States entered the World War, Mr. Joy foresaw that aviation would play an important part in the success of any major war activities. He purchased the land on which Selfridge Field is now located and when the United States entered the war, he offered to rent or sell this field to the government as a flying base. The government accepted Mr. Joy's offer and rented the field in the early part of 1917.

The agreement included an option to buy the field at Mr. Joy's original purchase price of \$190,000, less than \$300 per acre. Construction at the field began in the summer of 1917.

The field was developed as a concentration point and training camp for Air Service. Aero squadrons were prepared for overseas service in the World War. All buildings were of temporary frame construction. The government, up to April 16, 1920, spent \$2,300,000 on improvements. Many of the American aces either received their original training at this field or were stationed there before going overseas. (Lieutenant) Captain E. V. Rickenbacker, America's Ace of Aces, was a member of one of the squadrons at this field. The airport was named in honor of Lieutenant Thomas Selfridge, who was killed at Fort Meyer, Virginia, on September 12, 1908, in what was alleged to be the first Army airplane.

The status of Selfridge Field as a permanent Army station was unsettled for a long time. Many attempts were made to move the field to some other section of the country. Several states made a strong bid for it, but the loyal supporters of aviation in the state of Michigan fought for its retention here and won. In 1928 Selfridge Field was established as a permanent Army base and the construction of new and permanent buildings were begun. Modern brick buildings have now replaced all the original wood structures which were built during the war.

There are now four double modern brick hangars and about 100 other brick buildings. The take-off and landing runways are made of concrete and are each at least 3,000 feet long. The field is completely equipped for night flying which includes flood lights for take-off and landing. It has radio equipment for sending and receiving of messages and also for the control of flying maneuvers. The size of this airport is about one mile square and is wholly owned by the United States Government. Its present worth is listed at 10,000,000 dollars and is considered one of the finest military airports in the world. In 1931 the State of Michigan granted the field a section of land

for the construction of a sea wall to prevent flooding of the airport. Selfridge Field is the home of the First Pursuit Group of the United States Air Corps. This group was first stationed here after the Armistice was signed, and remained at this base until 1919; at the later date it was moved to another section. In 1922 the First Pursuit Group was returned to Selfridge Field and this has been its base up to the present time. Selfridge Field is at present in command of Colonel Henry B. Clagett.

PACKARD FIELD

Packard Field is believed to have been the first commercial field in Michigan. Its development was undertaken to provide flying facilities which would be closer to Detroit than Selfridge Field.

This field is now known as Gratiot Airport and is located on the south side of Gratiot Avenue, at 10½ Mile Road, in Roseville, Michigan, and is four miles west of Lake St. Clair. The land is now owned by the Newberry Estate and is leased to the Hartung Aircraft Corporation. This airport was originally a farm and was leased in 1919 by a syndicate which included Henry B. Joy and John Newberry. Later in 1919 this syndicate purchased the land and developed the site as a flying field. The field was used by the Packard Motor Car Company to test the Packard airplanes and the Packard Model 1237 engines which were built in 1919. The field is roughly rectangular in shape, 1350 feet wide, with an average length of 3700 feet and comprises an area of 164 acres.

After the World War the flying activities of the country were reduced considerably, and as a result the development of airports ceased almost entirely. Practically all the flying around Detroit took place from either Selfridge Field or Packard Field. At other cities, level farm land, race tracks, or the fair grounds were used as flying fields.

In November, 1922, William B. Stout organized the Stout Metal Airplane Company. This helped materially to again

develop interest in commercial aviation in Michigan. Flying activities were, however, handicapped due to the lack of proper flying facilities within a reasonably short distance from the center of population. This condition was brought to the attention of Henry and Edsel Ford. The Fords, because of their interest in aviation, which was developed through their manufacture of a large number of Liberty motors during the war, placed their support behind the new activity and agreed to provide a commercial airport within the metropolitan area of Detroit. This resulted in the Ford Airport.

THE FORD AIRPORT

The airport was opened early in 1929. In the same year Mr. Ford arranged for a factory site on the airport for the Stout Metal Airplane Company. The Ford Airport thus became the first airport in Michigan to combine flying and manufacturing activities at the same site. In 1925 the Fords purchased the Stout Metal Airplane Company and later built a larger factory and additional hangars. It is believed that this airport was one of the first to have permanent hard surface runways. In 1926 a passenger depot was established at the airport and the first regular passenger service was inaugurated from this airport on August 1, 1926. Flights of one round trip per day from Detroit to Grand Rapids were scheduled. The Ford Airport is one of the finest in the world. It is equipped for night flying operations and is one of the few airports to have an airship mooring mast. The airport is located immediately southeast of the City of Dearborn and nine miles west of the Detroit City Hall. The shape is irregular. The longest runway is 3500 feet long. The area comprises approximately 725 acres.

OTHER MICHIGAN AIRPORTS

In 1926 there were less than thirty airports and landing fields in Michigan, many of which were far from being service-

able for use by any but the most expert pilots. Of the thirty fields, three were in the Upper Peninsula and only three north of the Bay City-Muskegon line in the Lower Peninsula.

But new airports (commercial and municipal) in Michigan began to develop rapidly after 1926. Communities became aviation-conscious and today almost every city and town can boast of an airport of fair size and equipment.

It is estimated that there is in excess of fifteen million dollars invested in airports and landing fields, hangars and equipment in this state, exclusive of the Federal Army and Navy Posts. The outstanding airports from the standpoint of investment are the Wayne County and the Detroit City Airports, followed closely by the Grand Rapids and Pontiac Airports. Probably the outstanding airport in the Upper Peninsula is the Luce County Airport at Newberry. The Menominee County Airport was the first county-developed project, and the one at Kalamazoo was the first municipal project. The Crystal Falls Airport was the first to be equipped with an airport beacon in the Upper Peninsula.

The Pontiac Municipal Airport was the first airport in the United States to receive the Federal A.I.A. rating. It is located six miles from the city of Pontiac. The field is rectangular and comprises about 240 acres. It is equipped for night flying operations. The site for the airport was purchased by the city of Pontiac on September 12, 1928. The port was officially opened on November 27, 1928.

The Wayne County Airport was the first airport in the United States to receive the Federal A-T-A rating. This is the highest rating issued by the Department of Commerce and up to 1933 was assigned to only four other fields in the United States.

Plans for the Wayne County Airport were started on April 12, 1927. The land was purchased in March, 1929. The airport was dedicated and opened for service on September 4, 1930. The field is located 16 miles southwest of Detroit City

Hall. The area is about one mile square. The Aviation Division of the Michigan National Guard is located at this airport.

The Detroit City Airport is at present the center of air travel for the metropolitan area of Detroit. It is located 5½ miles northeast from the Detroit City Hall at the corner of Gratiot and Connors Avenues. The field is of "L" shape and the area is about 270 acres. Flying operations began in March, 1929. It is estimated that about 14,000 airline movements take place at this airport annually.

The airports at Kalamazoo, Muskegon, Bay City, Jackson, Battle Creek, Grosse Ile and Saginaw rank closely with the larger airports at Detroit and Pontiac.

There are many other airports in Michigan which are worthy of reference but the lack of space does not permit listing them. A complete list and rating of Michigan airports may be obtained from the Bureau of Aeronautics at Lansing, Michigan.

IV

MANUFACTURING

THE State of Michigan ranks high in the production of aircraft, engines and accessories. This is not a recent accomplishment. The manufacturers of Michigan took the lead in this field at an early date. A survey of the aviation industry in the United States in 1932, showed that the State of Michigan had 125 companies manufacturing aircraft, aircraft engines and accessories. The aggregate investment of these companies in equipment and manufacturing facilities was estimated to be in excess of \$10,000,000. The value of airplanes and parts produced in the United States during 1936 were \$47,531,565. The value of engines and parts was \$30,617,328. Some of the outstanding manufacturers in the aircraft industries are located in Michigan. Probably the most widely known manufacturers in this group who are at present in production are the Stinson Aircraft Corporation, Barkley-

Grow Aircraft Corporation, Continental Airplane Engine Company, Warner Aircraft Corporation, Hayes Industries, Inc., Ex-cello Aircraft and Tool Corporation, Berry Brothers and Flottorp Propeller Company. There are many others who are at present either engaged in experimental work or simply supplying parts for other manufacturers. It is interesting to note that several of the earliest airplane companies outside of Michigan owed their origin to men from this state.

The organization of the Wright Airplane Company in New York on August 23, 1908, was due largely to the vision of Russell A. Alger, a Detroitier. This was the world's first commercial airplane company and was capitalized at \$1,000,000. One of the first airplanes produced by this firm was brought to Detroit by Russell and Frederick Alger. Other pioneer attempts at the manufacture of airplanes, engines and accessories up to the beginning of the World War have already been outlined in preceding portions of this history. This section will deal only with those companies who actually produced these products in quantity, in Michigan, from 1914 to the present time.

GENERAL AIRPLANE COMPANY

One of the first companies organized specifically to manufacture airplanes in Michigan after the 1914 period, was formed in Detroit in 1915, under the direction of Alfred V. Verville. The firm was known as the General Airplane Company. Offices and plant were at 1507 East Jefferson Avenue. Mr. Verville had previously worked with Glenn Curtiss at Hammondsport, N. Y., on the design of the Curtiss-Jennings airplane and with Dr. A. F. Zahm on the first systematic airplane stress analysis in America. The General Airplane Company designed and built the first flying boat to be made in Detroit. This airplane incorporated a V-bottom hull and sharp bow and was powered by a Curtiss OX motor. The maximum speed was 85 miles per hour. Two years later, this flying boat was sold to the United States Navy for a training

ship. The G.A.C. also built pusher and tractor biplanes. Operations were discontinued during 1917 when Mr. Verville joined the engineering staff of the United States Army Air Corps experimental station at McCook Field. Associated with Mr. Verville in the General Airplane Company were Frederick M. Alger, Russell A. Alger, W. H. Muir, Herbert Book and Corwin Van Husan, all of Detroit.

THE WAR PERIOD

The years 1917 and 1918, the period in which the United States participated actively in the World War, gave Detroit and the State of Michigan its first opportunity to demonstrate what could be done in the quantity production of airplanes, aircraft engines, and accessories. It was natural for the United States Government, when it was in need of airplanes and other equipment along this line, in large quantities, to come to the manufacturers of Michigan, for the experience and facilities for the supply of this equipment. The experience gained through the quantity production of automobiles, with the use of precision tools, placed the manufacturers in this state in an excellent position to undertake any intensive program for the production of almost any kind of machine manufactured equipment. Thus we find that airplanes, aircraft motors and accessories were supplied to the air forces of the United States Government in large quantities from the State of Michigan during the World War. The manufactured articles were in most cases made from designs and specifications supplied by the United States Government. Howard E. Coffin, a Detroitier, was chairman of the Federal Aircraft Board. This Board was in charge of all aircraft manufacturing. Harold H. Emmons, another Detroitier, was in charge of all motor-manufacturing.

AIRPLANES

Airplanes during the War period were mostly wooden structures, covered with fabric. The fabric covering served to present a smooth contour and surface to the air. The manufacturers of automobile bodies and furniture in this state were well-equipped with wood-working production machinery. As a result the United States Government turned to them for the manufacture of a large number of the airplanes needed to supply its air forces, for training purposes in this country and for combat work in France.

The Fisher Body Corporation of Detroit was perhaps the most active in this field. They were one of the largest sources for the production of day bombers of the DH-4 (De Haviland) type and training airplanes of the Standard J type. They built 500 training airplanes in 1917 and over 1500 DH-4 day bombers in 1917 and 1918. At the peak of production in 1918, the Fisher Body Corporation made 40 DH-4 bombers per day. It is interesting to note that the Fisher production alone during this period is almost equal to the total number of airplanes, both military and commercial, made in the United States during 1931 and about double that of 1932.

This does not mean that the present plants are not capable of meeting such a demand, but simply indicates the relative magnitude of the two programs. In 1929, which was the peak year for the production of peace-time aircraft, the industry built over 6,000 airplanes. The total United States production in 1917 and 1918 was 11,754 airplanes.

The S. C. Wedman Company of Detroit, another automobile body manufacturer, developed and built veneer type fuselages of semi-monocoque construction, in 1918. This fuselage carried the Air Service designation USC-2 and USXB-1. The latter was similar to the type of fuselage made by the Bristol Aeroplane Company of England.

The furniture and veneer manufacturers of Grand Rapids, Michigan, also supplied airplane fuselages to the United States

Air Services during the War. The best known are the Haskelite Mfg. Corporation and the Davies-Putnam Company. They built the U. S. C.-2 and U.S.X.B.-1 type of veneer fuselages.

The Haskelite Manufacturing Corporation are at present engaged in the manufacture of aircraft plywood and ply-metal in addition to its other products. They maintain plants in Grand Rapids and Chicago. The company is capitalized at 1,100,000 dollars and was organized on December 10, 1917. During the War they developed a new type of water-proof aircraft plywood, which quickly took its place with the best plywood made in the United States. This firm has maintained and improved the good qualities of its products and as a result its plywood is still used extensively in the production of aircraft.

AIRCRAFT MOTORS

Before the United States entered the World War in 1917, many types of motors of different design were being built in this country, for foreign governments and local use. A survey of the industry by the Government soon after the United States entered the war showed conclusively that if airplane motors were to be built in sufficient quantities to enable them to keep up with the production of airplanes and the training of pilots, that any production program which they accepted would have to concentrate on only two or three designs. This survey also showed that there was no motor in this country or in Europe, developing the power required, which could be adapted to our methods of quantity production. The problem therefore was not only to build motors but also to design the motor upon which production would be concentrated. This problem was placed in the hands of the Equipment Division of the Signal Corps, who were charged with the design and production of all equipment for the Air Service. Edward A. Deeds of Dayton was chief of the division. Two Detroiters were members of the department and held responsible positions. One of

these, Harold H. Emmons, a Detroit attorney, who had also been engaged in the manufacturing business, was placed in charge of engine production. Mr. Emmons held the rank of Lieutenant in the United States Navy. In recognition of his splendid service in the production of the Liberty Motor, he was awarded the Distinguished Service Medal by the Secretary of War. The other Detroiter, Colonel Sidney D. Waldon, was formerly a vice-president and general manager of the Packard Motor Car Company.

THE LIBERTY MOTOR

The program to design a motor on which the United States should concentrate its greatest efforts, called for a type of aircraft engine which could be made in powers sufficiently high to assure continued usefulness for a term of years and which would possess the maximum degree of interchangeability between similar parts. This program won the unanimous support of both the American and European authorities. The result was the Liberty Motor. 15,572 Liberty Motors were built. The greatest number of these were constructed in Michigan and Detroit in particular. The Michigan companies engaged in the manufacture of the motor were the Packard Motor Car Company, Lincoln Motor Company, Ford Motor Company, and General Motors Corporation (Buick-Cadillac).

The design of the Liberty was largely the work of Colonel J. G. Vincent of the Packard Motor Car Company of Detroit and Lieutenant Colonel E. J. Hall of the Hall-Scott Motor Car Company of Berkeley, California. Both men had considerable previous experience in the design and manufacture of motors. J. G. Vincent was previously engaged for about two years in developing several types of 12-cylinder aviation engines, ranging from 125 to 225 horsepower. E. J. Hall for eight years previous had been developing and produced several types of aeronautical engines.

Their assignment called for a motor having only parts of proven design and which could be produced by quantity pro-

duction methods. The number of motors built in 1917 and 1918 gives ample proof that they fulfilled every part of their assignment successfully.

The first work on the Liberty Motor was started on May 19, 1917, and the first engine was delivered on July 4, 1917, in less than six weeks.

AIRCRAFT ACCESSORIES

Many aircraft accessories were made in the State of Michigan during the World War. Wire wheels were manufactured by the Sparger Wire Wheel Corporation, of Detroit, in 1918. This company also pioneered in the development of swedging aircraft wires and rods. The Kawneer Manufacturing Company of Niles, Michigan, supplies quantities of aircraft tubing needed in the manufacture of airplanes. Spare parts of various kinds were made by the Wilson Body Company of Bay City, and Hayes-Ionia Company of Grand Rapids. Experimental development work on engine radiators was carried out by the McCord Radiator Corporation of Detroit, in connection with the experimental program of the U. S. Air Services at McCook Field, Dayton, Ohio. In addition, many other smaller organizations in Michigan, engaged in the manufacture and supply of aircraft equipment to the United States Government.

AIRPLANE MANUFACTURING AFTER 1918

(For Glider Manufacturing see section Sporting Events)

The post-war depression resulted in a lull in the aviation manufacturing activities in the United States and the State of Michigan shared in the inactivity. But in 1921, plans were again under way to make Detroit and Michigan the center of the manufacturing for the aircraft industry. In October, 1922, Detroit was host to the National Air Races, and its feature event was the Pulitzer air race, which was held at Selfridge Field. In the same year the National Aeronautic Association was founded in Detroit during the Second National Aero Congress, October 12-14, 1922.

This association took over all the duties of sanctioning official aeronautical events and became the representation of the F.A.I. (International Federation for Aeronautics) in the United States. Howard E. Coffin, a Detroitier, was its first president. Thus Michigan was again beginning to play an important part in the aircraft programs of the country. New developments took place rapidly as new companies were formed and old established ones moved into Michigan.

A concerted effort to develop Detroit as an aircraft center was launched by the Detroit Board of Commerce. The growth of the local industry reached a new peak in 1929, when 248 airplanes were built in the Detroit district. The value of the airplanes and motors manufactured by 81 companies amounted to \$22,500,000.

STOUT METAL AIRPLANE COMPANY

The year 1922 also saw the organization of the Stout Metal Airplane Company. This company was organized by William B. Stout, and a group of prominent Detroit businessmen. In 1919 Mr. Stout was a member of the Committee on the Steel Construction of Aircraft, a division of the National Advisory Committee for Aeronautics. He was also prominent in engineering circles during the War and brought to his new company an excellent background of experience and foresight in the design and construction of airplanes and other engineering structures. He pioneered some of the original work in the construction of all-metal airplanes in the United States. Previous to the organization of the Stout Metal Airplane Company, Mr. Stout and his associates built a twin-engine all-metal airplane, which embodied a good many of the fine aerodynamic features found in our present high-speed bombing planes. Later, building programs were all devoted to purely commercial airplanes. Their first plant was located at Beau-bien and Piquette Sts., Detroit.

The first commercial airplane built by the Stout Metal Airplane Company, was an experimental 3-passenger cabin-type,

and was powered with a Curtiss OX-5 motor. This plane flew successfully, but was not put into production. Their second craft was an 8-passenger, all-metal, cabin-type equipped with a Liberty engine. Twelve of these planes were built. One was sold to the United States Postoffice for use in their air-mail program, three went to the Florida Airways for passenger service between Tampa and Miami, and three were used on the Stout Airlines between Detroit and Grand Rapids in 1926. The remaining five airplanes were used on the Ford Freight Lines and operated between Detroit and Chicago.

In 1924 the Company moved from its Detroit plant to a new factory at the Ford Airport in Dearborn. Later the first Stout tri-motored airplane was built at this plant and proved so successful that plans were immediately laid for the production of this airplane in quantities.

In 1925 the Stout Airplane Company was purchased by the Ford Motor Company, which continued the manufacture of the tri-motored airplane. Mr. Stout remained with the Ford Company until 1929. In that year he organized another new company under the name of Stout Engineering Laboratories, Inc.

This new firm is located in Dearborn, Michigan, and is engaged primarily in the development of new types of airplanes and other transportation units. In 1931 the Stout Engineering Laboratories produced the Stout Sky Car. This airplane was built to supply the needs of the private owner. Only one airplane of this design was built. It has been flown continuously by Mr. Stout and others.

In 1932 Mr. Stout turned his attention to other units of transportation with the thought of applying the light-weight-high-strength type of construction used in aircraft to rail-cars and buses. He obtained a contract to build a high-speed rail car for the Pullman Car & Manufacturing Company of Chicago. This vehicle was completed and successfully tested in 1933 and delivered to Chicago early in 1934. Since that time, the company has continued its work in the application of its

airplane experience to motor buses and automobiles and expects to announce a new type of bus in the near future.

FORD MOTOR COMPANY

(Airplane Division)

The Ford Motor Company played an important part in the building program of the Liberty motor during the War, in the period of 1917 and 1918. It was thus natural for them to again become a part of the aircraft industry when it became apparent that commercial aeronautics was to take its place as one of the new industries of the United States. In 1924 they built the Ford Airport at Dearborn, Michigan, and later built a plant on this airport for the Stout Metal Airplane Company. In 1925 the Ford Motor Company purchased the Stout designs and continued to manufacture the Stout-tri-motored airplane as a division of their own company. This new division progressed rapidly under the efficient Ford production methods and soon took its place as one of the important leaders in the aircraft industry of the United States. Stout tri-motored airplanes, built by Ford, and later improved airplanes of this type designed by Ford engineers, under the direction of William B. Mayo and H. A. Hicks, were used by practically all the major airlines of the country. They were used from coast to coast and also in foreign countries, on Central and South American routes and in Alaska. The company soon became one of the best known airplane manufacturers in the United States. The last Ford tri-motored airplane was designated as the Ford 5D, and was equipped with three Pratt and Whitney Wasp engines. The plane had accommodations for sixteen passengers. This model was very popular with the airline operators up to the year 1932. In that year the Ford Motor Company, due to the depression and the general combining of the airline operators with manufacturers into single units, practically stopped new developments and production. The firm became one of the few independent manufacturing

units and while they continued to supply airplanes of the 5-D type in small numbers, the bulk of their previous airplane sales went to the manufacturers who were combined with the airline operators.

In 1932 the Ford Motor Company built an experimental super-transport with a seating capacity for 36 passengers. The airplane was known as the Ford 14-A and was equipped with three-water-cooled Hispano-Suiza motors. The passenger cabin had all the luxuries of the modern Pullman. The airplane had a span of 110 feet and was 80 feet long. Like all Ford airplanes it was all-metal. Plans for the production of this airplane were dropped in 1932.

The Ford Motor Company also experimented with a "Fliver" plane. In 1927 they built an experimental single-seater airplane of the low wing type, equipped with a three-cylinder Anzani motor. This airplane, contrary to Ford practice in the larger machines, was of steel tube and wood construction, and covered with fabric. Later a two-cylinder motor, built by the Ford interests, was installed. The airplane flew very successfully and possessed fine flying characteristics. Plans for the production of this airplane were dropped due to an accident with the airplane in Florida in which Harry Brooks, Ford's chief pilot, was killed.

In 1932 the Ford Motor Company also built an experimental single-motored all-metal freight airplane. This machine was very similar to the tri-motored airplane in its construction but was equipped with a single-water-cooled Hispano-Suiza motor of 800 H.P. In 1934 an air-cooled Wright Cyclone motor was installed and the airplane was sold to the Pan-American Airlines for use on its lines in Alaska.

Production at present at the Ford airplane plant is in a lull, but it is expected that airplanes may again be built in production in the future.

STINSON AIRCRAFT CORPORATION

Plans for the organization of the Stinson Aircraft Corporation were begun in 1925, by Edward A Stinson, better known as "Eddie" to the aircraft industry, and a group of prominent Detroit businessmen, which included William A. Mara, the aviation secretary of the Detroit Board of Commerce and now vice-president of the corporation. Stinson conceived the plan to build a commercial airplane which would incorporate all the comfortable features of the automobile with the good travelling characteristics of the airplane. He wanted the passengers to ride in a closed cabin, which would be well ventilated in the summer and heated in the winter. He wanted his airplane to be equipped with wheel-brakes for better ground performance and to incorporate all the aerodynamic features to make it stable and safe. He outlined this plan to his friend, William Mara, who immediately became convinced of its merits and, together with a group of Detroiters, they organized the Stinson Airplane Syndicate to build the first airplane. It is interesting to note that the first drawings for this airplane were prepared at the University of Detroit under Mr. Stinson's directions, by Arthur Saxon, who later became chief engineer of the company, and by Peter Altman.

The first airplane was completed early in 1926 in an old plant on West Congress Street, Detroit, and performed satisfactorily in its first test flights. It was an equal-span biplane, with seats for two pilots and two passengers or one pilot and three passengers and was powered with a 200 H.P. Wright Whirlwind air-cooled motor. The airplane contained many advanced features, incorporated in it from the experience which Mr. Stinson had gained in his long flying record. Edward A. Stinson was one of the best-known pilots and in most quarters was called the dean of American flyers. He learned to fly about 1911 and during the World War was engaged in training pilots for the United States Government. After the War he established a remarkable record as a test

pilot of experimental aircraft and thus learned a great deal about the engineering and stability features desired in a good commercial airplane. This experience contributed much to the success of the Stinson airplanes and to their good flying qualities.

After the successful test flights of the first airplane, the Stinson Airplane Syndicate was formed into the Stinson Aircraft Corporation and the firm started under its new name on May 4, 1926. Edward A. Stinson became president, J. K. Livingston, chairman of the Board, Henry E. Hurd, vice-president, William A. Mara, secretary and Richard Fitzgerald, treasurer. Included as directors were a number of prominent Detroiters. Harold H. Emmons was general counsel. The company leased a plant at Northville, Michigan, and began the manufacture of its four-place cabin biplane. A flying field was also obtained at Northville to facilitate flight-testing and for general flying activities.

The Stinson biplane soon took its place as one of the finest commercial airplanes in the United States. Many of these airplanes were built and all helped to establish the good record of the company. In 1927 the Stinson Aircraft Corporation, under William C. Naylor, as chief engineer, produced its first monoplane. This craft proved superior to the biplane model and so replaced it. Four, six and eight-passenger airplanes of this type were built and several of them established records for performance and reliability. The Schlee-Brock airplane, known as the "Pride of Detroit", which flew from the East coast of the United States to the Pacific Coast of Asia by way of the Atlantic and Europe, was a Stinson-built monoplane. In 1927 Edward A. Stinson won the Edsel B. Ford Reliability Trophy in the National Air Tour, with a Stinson airplane.

Business reached its peak in 1928 and 1929. The volume became such that the company was forced to look for larger quarters. In 1928, a site was purchased outside of Wayne, Michigan, and a modern plant and airport was established. The company moved to this new plant in 1929 and is at present

still located there. It is one of the few companies in the State of Michigan who are still engaged in the production of airplanes in quantities and who came through the depression without having to be re-organized or re-financed. This was due largely to its good sound management under Mr. B. D. De Weese, president, and Mr. William A. Mara, one of its organizers.

In 1930 the Stinson Aircraft Corporation became a division of the Cord Corporation. The company merged with the Cord group largely because another division of that group was building a motor suited to the type of airplane made by the Stinson Aircraft Corporation. This engine was being built by the Lycoming Manufacturing Company of Williamsport, Pennsylvania. It was evident to the Stinson officials that such a combination would give the company an unexcelled advantage in the production and sale of its airplanes. That this was a well-calculated change is proven amply by the splendid record set up by this firm and by its strong financial position. The Stinson Aircraft Corporation has become one of the largest manufacturers of commercial cabin airplanes in the United States and is one of the best known divisions of the Cord Corporation. It has continued to build a high grade four-place cabin airplane, improved from year to year, which has won favor all over the United States and in many foreign countries.

In 1930, when the Stinson interests merged with the Cord Corporation, it took over the development and manufacture of a tri-motored airplane, which had been started by the Corman Airplane Company, another division of the Cord group. This airplane was designated as the Stinson Model T and was built to seat 10 passengers and a pilot. A number of these planes were sold to the Ludington Airlines, who were the first to operate an hourly schedule between New York and Washington. The low first cost and the economically operating expense of the airplane, coupled with the good management and enterprise of its officers, enabled the Ludington Airlines to operate at a profit without an air-mail contract from the Government.

Later, airplanes of the same type were supplied to the Century Airlines for use between Detroit, Chicago and Cleveland; and to the Century Pacific Airlines for use on the Pacific Coast and between Los Angeles and Texas. A number of these airplanes were also sold to other airlines and private operators.

In 1932 the Stinson Aircraft Corporation replaced its Model T Airliner with a new and improved airplane, which was designated as the Model U. The same year, its four-place Model S airplane was changed to the Model R, which was offered with either fixed landing gear or retractable landing gear. In 1933 the four-place cabin airplane was again improved and its designation changed to the Model S R. Early in 1932, the officials of the company realized that if commercial airlines were to successfully compete with other methods of transportation the cruising speed of its airplanes would have to be materially increased. It therefore undertook an experimental program to develop an airplane which would possess the good features of its previous models in first cost, economy of operation, and reliability, but one which would have a cruising speed in excess of 150 m.p.h. In 1934, as a result of this program, the Stinson Aircraft Corporation produced its Model A tri-motored airliner which is claimed to have the comfort of a Pullman car and to cruise in excess of 155 m.p.h. It thus became the fastest commercial tri-motored airplane in the United States. It is believed that many more of these Michigan-made airplanes will soon be seen on the airlines of the United States and other countries.

The Stinson Aircraft Corporation has also developed a high-wing strut-braced, four-purpose, airplane which can be used as a primary trainer, advanced trainer, light fighter, and as a cargo airplane. It is a two-place open-cockpit airplane powered by a 215 H.P. Lycoming motor. A number of these airplanes have been sold to foreign governments.

The Company is capitalized at \$500,000 and does an annual business of over \$2,000,000. It builds from 100 to 250 airplanes per year, and employs some 400 people. The present

officers of the firm are:—B. D. De Weese, President, W. A. Mara, Vice-President, B. S. Pruitt, Secretary and O. R. Stocke, Treasurer.

BUHL-VERVILLE AIRCRAFT COMPANY

This company was organized in 1925 under the direction of Alfred V. Verville, who was previously with the Engineering Division of the U. S. Army Air Corps, at McCook Field, Dayton. It will be remembered that Mr. Verville also organized the General Airplane Company of Detroit in 1915, and during the World War left the company to join the Air Service Experimental Station. At McCook Field he supervised the design of the Verville-Sperry Messenger Airplane, the Verville-Packard Racer which won the Pulitzer Race in 1920, and the Verville-Sperry Racer which won the Pulitzer Race in 1924. In addition, as Chief of Pursuit and Racing Design for the U. S. Army Air Service, he directed the design of a number of other airplanes.

He thus brought with him much valuable experience in both commercial and military airplane design. The first product of this company was a three-place, open-cockpit airplane, powered with an OX5 motor, which had incorporated in it many novel features. Several of these airplanes were built and sold. In many respects, particularly as to detail design, it was far in advance of any similar commercial airplane made in the United States at that time.

The company was located in a section of the Buhl Stamping plant at 2730 Scotten Avenue.

Mr. Verville later left the Buhl-Verville organization to organize another company of his own. In 1927 the name of the first firm was changed to the Buhl Aircraft Company.

BUHL AIRCRAFT COMPANY

About 1928, after the reorganization, this company moved their aircraft manufacturing and flying activities to Marysville, Michigan. Mr. E. Dormoy became Chief Engineer. They pro-

duced the Buhl Air-sedan, a cabin biplane of sequi-plane arrangement and the Buhl Bull-Pup, a small single-seater, wire-braced monoplane, powered by a three-cylinder Szekely engine. In 1932 the firm discontinued its manufacturing activities because of the general business depression and is at present inactive in the aircraft field.

VERVILLE AIRCRAFT COMPANY

After leaving the Buhl-Verville Aircraft Company, Mr. Verville made a trip to Europe to study foreign airplane and airline developments. After he returned, he organized the Verville Aircraft Co. and designed a four-place cabin monoplane, which was known as the Verville Air-Coach. A number of these airplanes were built and sold. The airplane was offered with a choice of power plants, which included engines from 160 to 225 H.P. In 1929 and 1930, the firm developed a training airplane, four of which were sold to the U. S. Air Corps and several to private operators. The concern went out of business in 1932 due to the general business depression. Their plant was located at 7424 Melville Avenue, Detroit. Mr. Verville is now in the aviation manufacturing section of the U. S. Department of Commerce.

AIRCRAFT DEVELOPMENT CORPORATION

In 1921 a group of Detroit men associated principally with the automotive industry, came to the conclusion that the future of rigid airships lies in all-metal construction, and therefore they undertook to investigate its possibilities and conducted a preliminary research on the subject. As a result of this study, the Aircraft Development Corporation was organized in 1922 under the direction of Carl B. Fritsche. Systematic experiments were started on sheet aluminum alloy to determine its fireproof qualities, seam-strength and gas-tightness. Other investigations were made, and in 1925 the company decided to build an all-metal airship of 200,000 cubic feet gas capacity

to test the feasibility of its design. The design of the ZMC-2 was completed and submitted to the Government with a proposal to build one of these airships for the United States Navy. In 1926 Congress appropriated \$300,000 for its construction. The ZMC-2 was completed in 1929 and made its first flight on August 19 of that year at Grosse Ile Airport, Grosse Ile, Michigan. Captain William E. Kepner, on leave of absence from the Army Air Corps, was the pilot. The airship completed all the tests required by the Navy without difficulty and thus became the World's first successful all-metal airship. After the tests at Grosse Ile, the airship was flown to Lakehurst, New Jersey, and delivered to the United States Navy for use as a training airship. It has met all performance and reliability requirements to date and has amply proved the merits of its type of construction. For some time the work in this field was continued by a new concern under the name of Metal-clad Airship Corporation, Detroit, Michigan. Carl B. Fritsche is president and general manager, A. G. Schlosser, vice-president, G. W. Fritsche, secretary and E. W. Parcells, treasurer. This company was formed in 1932 when the Detroit Aircraft Corporation went into the hands of receivers. The Aircraft Development Corporation also designed and built two airship mooring masts, one at the Ford Airport and the other for the United States Army at Scott Field, Illinois.

DETROIT AIRCRAFT CORPORATION

In 1929 the Aircraft Development Corporation changed its name to the Detroit Aircraft Corporation. The new firm elected Edward S. Evans president, and laid plans to expand their activities in the airplane manufacturing field. One of the divisions of the new company retained the name of Aircraft Development Corporation and carried on the lighter-than-air development work.

The Detroit Aircraft Corporation, at first, did not develop any new designs, but combined the activities of a number of

older manufacturers into a single central operating unit. The firms which formed this corporation were:—(a), Aircraft Development Corporation, Detroit, builders of airships and special aircraft devices; (b), Eastman Aircraft Corporation, Detroit, builders of sea-planes; (c), Marine Aircraft Corporation, Detroit, experimental manufacturers of amphibians; (d), Blackburn Aircraft Corporation, Detroit, holders of design and patent rights to the Blackburn Aeroplane of England; (e), Aviation Tool Co., Detroit; (f), Grosse Ile Airport, Inc., Grosse Ile, Michigan; (g), Lockheed Aircraft Corporation, Burbank, California, builders of high speed commercial cabin airplanes; (h), Ryan Aircraft Corporation, St. Louis, Missouri, builders of commercial airplanes and designers and builders of Colonel Lindbergh's "Spirit of St. Louis".

Most of these companies had established fine operating records and a reputation for dependable aircraft equipment. One or two of the units were purely experimental and had never established themselves in either the experimental or production field of the industry. Why some of them were taken into the corporation has never been satisfactorily answered. The Detroit Aircraft Corporation became one of the largest aircraft holding companies in the United States. It was authorized to sell 2,000,000 shares of common stock of no par value. In 1929 market value of the stock was estimated at \$10 per share, which gave them a nominal capitalization of \$20,000,000. Over 1,000,000 shares of stock were outstanding in 1931. On October 23, 1931, the Detroit Aircraft Corporation was placed in the hands of receivers and in 1932 discontinued its manufacturing activities. Several of its units were sold back to their original owners. On October 13, 1933, the United States Federal Court dissolved the old company and the Detroit Aircraft Corporation was reorganized. Plans were attempted under the direction of William B. Mayo, to place the company back into the manufacturing field of the aircraft industry. The officers of the old company were:—Harold H. Emmons, chairman of the Board of Directors; Edward S. Evans, president; James Work,

vice-president; Carl B. Fritsche, vice-president; Charles A. Parcells, secretary.

BARKLEY-GROW AIRCRAFT CORPORATION

This company was organized in 1936 to manufacture all-metal transport airplanes. It has developed an 8 place transport airplane incorporating a number of interesting and novel features and is now in production on this airplane. The plant and general offices are located at 13210 French Road, Detroit. The plant faces the Detroit City Airport. H. B. Grow is president, A. S. Barkley, vice-president and Robert R. Stoetzer, Secretary-Treasurer.

OTHER AIRPLANE MANUFACTURERS

Several other companies in Michigan built experimental and production airplanes but to a lesser degree than those listed above. Most of these were organized at about 1929, at the peak period of aircraft production in the United States, but are now either out of business or inactive. Some of these companies were (a) Cadillac Aircraft Corporation, Northville, Michigan, Harry R. Graham, President; experimental twin-motored cabin amphibians; (b) Dare Airplane Company, Detroit, George H. Monaghan, President, experimental all-metal, variable chamber, low-wing monoplanes, first organized in 1921; (c) Driggs Aircraft Corporation, Lansing, H. E. Harper, President, production of "Skylark" 2-place open cockpit biplane from the designs of I. H. Driggs; (d) Hise Aircraft Company, Detroit, Fred H. Hise, President, experimental tri-motored monoplanes; (e) E. P. Hurd Company, Detroit, experimental low-wing monoplanes; (f) Levert Aircraft Company, Pentwater, experimental all-metal biplanes; (g) Luthy Flying Services, Inc., Jackson, F. A. Luthy, President, experimental airplanes; (h) Mack-Craft Amphibian Corporation, Plymouth, R. U. McIntosh, President, experimental amphibians.

AIRPLANE ENGINES (1919-1937)

Packard Motor Company

This company began building aircraft engines in 1915 and was very active in the design and manufacture of the Liberty engine during the World War, and continued this activity afterwards. In 1919 they developed their Model 1237 engine, built to replace the Liberty; but due to the large number of new Liberty engines available, only a small number of the Model 1237 engines were built. Later, the Packard Motor Company developed their Model 1500 and Model 2500 aircraft motors. These engines were of the 60° Vee 12-cylinder water-cooled type, having a rating of 600 B.H.P. at 2500 r.p.m. for the smaller engine and 800 B.H.P. at 2000 r.p.m. for the larger one. A large number of these engines were sold to the United States Navy for installation in its Patrol flying-boats and other airplanes, and to the United States Army Air Corps for use in a number of its pursuit airplanes. About 1927 the Packard Motor Car Company discontinued the manufacture of liquid-cooled aircraft engines in quantities. It then undertook the development of an air-cooled aircraft Diesel engine of the radial type. The development work was completed and the engine successfully test-flown in 1929, and the Packard Motor Car Company thus gained the distinction of producing one of the first successful aircooled aircraft Diesel engines and the first engine of this type in radial form. The development of this engine was carried out under the direction of Captain L. M. Woolson, who was in charge of aircraft engine design for Packard. Captain Woolson also supervised the design of the Packard Model 1500 and of Model 2500 engines.

The Diesel engine was put into production and a number sold in the United States and in foreign countries.

The Packard activity in the aircraft engine field was temporarily discontinued in 1932, partly due to the death of Captain Woolson and partly because of the general business depression of that period. It is hoped that they will soon resume

their manufacturing activities in the aircraft engine field and again take their place as one of the leading manufacturers of the industry.

Continental Aircraft Engine Company

The demand by the commercial aircraft industry for an air-cooled aircraft engine which could be purchased at a reasonable price per horsepower became so great in 1928 and 1929, that a number of the larger automotive engine manufacturers entered this field. On July 22, 1929, Continental Motors Corporation of Detroit, one of the largest independent manufacturers of internal combustion engines, organized the Continental Aircraft Engine Company to develop and build commercial aircraft engines. Mr. Robert Insley, formerly of Wright Field, was placed in charge and under his direction, the company developed a 7-cylinder air-cooled radial engine, which developed 170 H. P. and was designated as the Model A-70. This engine proved to be very reliable and was soon used by a number of airplane companies. Later, the power of this engine was increased to 210 H.P. and its designation changed to the Model R-670. They also developed a small 4-cylinder opposed air-cooled engine for small private airplanes, known as the Model A-40, which developed 38 H.P. Both of these engines are in production at their Detroit plant and have gained an excellent record for economy and reliability.

The Continental Aircraft Engine Company has also built a number of special experimental engines for the United States Government. W. R. Angell is president of the concern.

Warner Aircraft Corporation

(Aircraft Products Corp. of America)

The Warner Aircraft Corporation was organized by a group of Detroit businessmen, including Charles B. Bohn and William B. Mayo, on October 20, 1926. Under the direction of W. O. Warner, they developed a 7-cylinder air-cooled radial

engine of 110 H.P. which became known as the Warner Scarab. The first engine proved very successful and was immediately put into production. A large number have been used in airplanes in the United States and in foreign countries, and many record flights have been made in airplanes which were equipped with it. An average of about 117 engines of this model have been built annually during the past few years.

The company also builds a five-cylinder radial engine, and a larger 7-cylinder engine. The latter is known as the Super-Scarab. All three models are in production at present and are being used by a number of prominent airplane manufacturers.

On January 1, 1932, the Warner Aircraft Corporation took over the manufacturing activities of the Aircraft Products Corporation of America. This company was organized in April, 1928, to manufacture aircraft accessories. It made wheels, brakes, shock-absorber struts, pontoons and ski for aircraft. These accessories are now made by the Warner Aircraft Corporation and are used by a number of airline and private airplane operators as well as by the military aviation forces of the United States Government.

All the manufacturing is carried on in a modern plant on Hoover Avenue, Detroit. Mr. W. O. Warner is president and R. R. Irwin, vice-president.

Other Airplane Engine Manufacturers

The Detroit Aircraft Engine Works (Syn), was one of the pioneers to develop a commercial air-cooled radial engine in Michigan in the post-war period. In 1925 Glenn D. Angle, formerly with the engine section of the United States Army Air Corps, designed a five cylinder radial-engine (air-cooled) which developed about 60 H.P. at 1650 r.p.m and 75 H.P. at 2400 r.p.m. E. (Eddie) V. Rickenbacker, American Ace, was associated with the company in an advisory capacity. The first engines were built in a terminal building on Lonyo Blvd., Detroit. Their product proved very successful and a number

of engines were sold. Later, the company was absorbed by the Le Blond Aircraft Engine Company of Cincinnati, Ohio. This company is at present inactive in the aircraft engine field.

American Cirrus Engine, Inc., of Marysville, Michigan, was organized about 1929 to manufacture the English four-cylinder in-line air-cooled motor. A large number of these motors were built and were used principally in the Great Lakes two-place biplane. The company, is, at present, inactive.

Michigan Aero Engine Corporation, Lansing, Michigan, developed an inverted four-cylinder in-line air-cooled aircraft engine about 1929. A number of these engines were built and used principally in the Driggs biplane. The company is at present inactive.

Szekely Aircraft and Engine Company, Holland, Michigan, developed and built three types of air-cooled radial aircraft engines which developed 40 H.P., 70 H. P. and 100 H.P. in about 1928. The small engine was used in the Szekely Flying Dutchman airplane which was also built in Holland, Michigan. The original Flying Dutchman airplane was designed at the University of Detroit. The larger engines were used by several airplane manufacturers in the United States. The company is at present inactive.

ACCESSORIES

From the earliest developments in aviation, manufacturers in Michigan have supplied many of the accessories needed for aircraft. As early as 1911, the Continental Caontouchouc & Gutta Percha Company, Muskegon, Michigan, supplied fabrics for airplanes and airships. In 1910 the Holley Brothers Company, Detroit, manufacturers, supplied carburetors for airplane engines. In the same year the Anderson Forge Company, Detroit, made crankshafts for Curtiss, Wright and others. Wolverine Aeronautic Company of Albion and Detroit Aeronautic Corporation, made airplane propellers. In 1912 airplane engine radiators were supplied by the Wolverine Radiator Company, Detroit. And so on during the World War to

the present date, Michigan manufacturers were called on for airplane accessories.

At present, there are a number of well known Michigan manufacturers in the aircraft accessories field. The most prominent of these are: (a) Ex-Cell-O Aircraft and Tool Company, Detroit, precision machinery parts. Many of the parts for the Wright aircraft engines are made by this company; (b) Hayes Industries, Inc., Jackson, Michigan, aircraft wheels; (c) Warner Aircraft Corporation, airplane wheels, brakes, floats, shock-absorber struts and skis; (d) Grovo-Nelson Company, Detroit, engine parts; (e) Berry Brothers, Inc., aircraft finishes; (f) Flottorp Propeller Company, Grand Rapids, airplane propellers; (g) United States Rubber Company, airplane tires; (h) Dow Chemical Company, Midland, magnesium alloys, and many other companies who supply standard automotive parts which find useful application in aircraft.

V

AERONAUTICAL EDUCATION

THE STATE OF MICHIGAN leads the rest of the country in aeronautical education. According to the Aircraft Yearbook for 1933, twenty-one universities in the United States offer curricula leading to specialized degrees in aeronautics. Of these, three of the largest are located in Michigan. They are the University of Michigan, University of Detroit, and Wayne University. There are also several colleges that include courses in aeronautics which are elective to students enrolled in other branches of engineering. These courses do not lead to an aeronautical degree. In addition, a number of high schools in Michigan offer aviation courses to students. There are ten major aerodynamical laboratories in American institutions. Two of the largest of these laboratories are in this state. One at the University of Michigan and the other at the University of Detroit.

The graduates of the colleges in Michigan can be found in many responsible positions throughout the United States and in foreign countries. Many of the developments in the science of aeronautics may be traced to the schools in the State of Michigan and to the work of its graduates.

UNIVERSITY OF MICHIGAN

It was as early as 1911, only eight years after the first successful flight of the Wright airplane in 1903, that courses in aeronautical engineering were available to students in this state. That year, the University of Michigan at Ann Arbor, under the direction of Professor Felix Pawlowski, offered its first courses in Aeronautics through its Mechanical Engineering Department. In February, 1915, the aeronautical courses were transferred to the Department of Naval Architecture and Marine Engineering. It became a branch of that department under the direction of Professor Herbert C. Sadler, now Dean of the College of Engineering. Professor Pawlowski continued as the aeronautical instructor. The first diplomas setting forth the attainment of the degree of Bachelor of Science in Aeronautical Engineering were granted in 1917. Previous diplomas which were issued to students who included aeronautical studies in their curriculum, were granted in Mechanical or Marine Engineering.

The University of Michigan offers complete courses in aeronautics in both its undergraduate and graduate schools. These courses lead to the degrees of Bachelor of Science in Aeronautical Engineering, Master of Science in Engineering, Doctor of Science, and Aeronautical Engineer. Professor Edward A. Stalker, a graduate of the University of Michigan, is the present director of the Department of Aeronautical Engineering.

This department maintains complete and well-equipped aerodynamical and structural laboratories. In addition, it also has available the facilities in the other engineering departments of the University.

The aerodynamical laboratory consists primarily of a large wind tunnel with an eight-foot diameter throat and the necessary equipment for the testing of propellers, airplane models and other objects included in aerodynamical research. This tunnel is used principally for research work by senior and graduate students. A small eighteen-inch diameter tunnel is available for routine instruction. All students have the opportunity to work in the large tunnel during their regular course.

The Aeronautical Club was officially organized in 1912 and is one of the oldest in America. It embraces all of the aeronautical activities on the campus, which includes gliding, ballooning and other aviation enterprises. The club has been very active and pioneered in the revival of gliding in the state in 1928. It has gained many honors in this field.

UNIVERSITY OF DETROIT

The University of Detroit was another of the pioneers of aeronautical engineering training in this state to achieve distinction for its work in this field.

The Aeronautics Department at the University of Detroit was planned and inaugurated in 1920, under the direction of the Reverend John P. Morrissey, S.J., who was the regent of the College of Engineering. Lieutenant Thomas F. Dunn was the first director of the Aeronautics Department. The instructional work in the courses of aeronautics was given by Professor Clarence H. Powell. Professor Powell was previously associated with the National Physical Laboratories and the Sopwith Aeroplane Company in England and the Massachusetts Institute of Technology in this country. In 1922 the Department of Aeronautics was reorganized and Professor Powell was appointed its director. He served in this position until June, 1926, and then returned to England. The Reverend John P. Morrissey again became director of the department and Professor Peter Altman gave the instructional work. Professor Altman was the first student at the University of Detroit

to be granted the diploma of Bachelor in Aeronautical Engineering. He was placed in complete charge of aeronautical instruction in 1928 and is at present the Director of the Aeronautics Department. The first diploma in aeronautical engineering was conferred at the University of Detroit in 1925.

Complete courses in Aeronautics at the University of Detroit are at present offered only in the undergraduate school of the College of Engineering. The courses are arranged under the U. of D. Cooperative Plan of Education, and five years are required to complete the course. The first two years are continuous, i.e., only academic subjects without the industrial shop work are scheduled. The remaining three years are cooperative. During the latter period, the student spends alternative four-week periods in academic work on the campus and four-week periods in industrial shops in Detroit and surrounding communities. Successful completion of the course leads to the degree of Bachelor in Aeronautical Engineering.

The University of Detroit maintains modern and well-equipped aerodynamical and structural laboratories. In addition, it has available the facilities in the other engineering departments. The aerodynamical laboratory consists primarily of a large wind tunnel with a 7 x 10 foot working section and the necessary equipment to the test airplane models, propellers, and the objects included in aerodynamic research. The tunnel is used for both student laboratory work and industrial research. In addition, there is a small, 7 x 10 inch tunnel for instrument calibration and other aerodynamical experiments. All students have the opportunity of using both tunnels.

The University of Detroit Aeronautical Society was organized in 1921 and directs all the aeronautical activities on the campus. This includes the activities of the Flying Club, the Glider Club and other aviation enterprises. In 1924, under the direction of Professor Clarence H. Powell, it designed and built the Powell Racer. This racer was largely the results of Professor Powell's designing experience and enterprise. The project was mostly financed by Professor Powell's personal

funds. The airplane was entered in the International Air Races at Mitchell Field, New York, in 1925, and won all the events in its class. It was awarded the Aero Digest Trophy, the Dayton Daily News Trophy and the Scientific American Trophy, and about \$2,000 in cash prizes. The airplane was equipped with a small two-cylinder Bristol Cherub air-cooled motor. The machine weighed 510 lbs. complete with pilot. The maximum speed was 86.5 m.p.h.

The Glider Club built its own glider in 1928 and won several honors with this machine, including the Aero Digest Glider Trophy at the Cleveland Air Races in 1930. It is at present building a new type secondary glider in which is incorporated a number of novel features.

Flying training has always been optional to the student at the University of Detroit. In 1921 this training was offered through the Aeronautics Department. The equipment consisted of a "Standard" training airplane, which was equipped with an Hispano-Suiza motor of American manufacture. Operations were first based at Selfridge Field and then at the Packard Field, on Gratiot Avenue. The flying instructors were Lieutenants Thomas F. Dunn and Arthur Robertson. This flying program was discontinued in 1923, due to the great expense involved. Optional flying training, on a charter-basis, was begun in 1928, under the auspices of the U. of D. Flying Club. In 1931 this club purchased a Curtiss Wright Junior airplane for the use of its members. Flying at present is again conducted on a charter-basis, with the Land-O-Lakes Flying Service at Pontiac, Michigan. Several members fly their own airplanes.

WAYNE UNIVERSITY

Wayne University, Detroit, Michigan, under the direction of Dr. W. H. Gerhardt, inaugurated a complete undergraduate course in aeronautical engineering in 1930. The first degrees of Bachelor of Science in Aeronautical Engineering were bestowed in 1933.

The Aeronautics Department maintains a small wind tunnel for student laboratory work and also has an airplane structural laboratory and shop.

The Wayne Glider Club is the official student aviation club on the campus. This club has been active in a new development in sailcraft, known as a "Wing-Boat".

LAWRENCE INSTITUTE OF TECHNOLOGY

This institute was organized in Detroit in July, 1932, and included an undergraduate course in Aeronautical Engineering in its curriculum. It offers a five-year cooperative course. It presented its first diploma in Aeronautical Engineering in June, 1933. The instructional work is given by Mr. Walter E. Durnhan. The institution has a Glider Club and has been active in this field.

DETROIT INSTITUTE OF TECHNOLOGY

This school offers optional courses in Aeronautics to its students enrolled in its other branches of engineering.

CASS TECHNICAL HIGH SCHOOLS OF DETROIT

This high school is under the direct supervision of the Detroit Board of Education. It first offered instruction in aeronautics in April, 1925, through its evening school. Day classes were scheduled in September, 1928. The aeronautics division of the Cass Technical High Schools is under the direction of Mr. B. E. Ott.

The students at this school have been active in the construction and flying of gliders and have achieved many honors in this field.

OTHER EDUCATIONAL INSTITUTIONS

There are a number of other technical institutes and high schools throughout the State of Michigan, who include courses in aeronautics in their curricula. The public schools of the

state have also been active in aviation, principally through their model airplane clubs. Members of these clubs have built model airplanes which have brought honor to the State of Michigan. In 1927 Jack Loughner, a Detroit high school student, won the National Model Airplane Contest for the second time.

VI

SPORTING EVENTS—REGULATING AGENCIES

MANY aeronautical sporting events were held in Michigan in the early days of aviation, dating from about 1908. In that year, the Aero Club of Michigan was organized by a group of prominent Detroit men. Their actual charter is dated February 14, 1910. This club became the Detroit Aviation Society on April 25, 1921. The early activities of this group have already been listed in the section on Pioneer Adventures. In October, 1922, the Detroit Aviation Society sponsored the National Airplane Races at Selfridge Field, and in the same year produced the leadership which resulted in the organization of the National Aeronautic Association. One of its members, Howard E. Coffin, became its first president. In 1922 to 1924, its members were very active in helping to establish aircraft manufacturing units in Detroit. The first National Air Tour in 1925 was organized largely through the assistance of the Detroit Aviation Society and the Detroit Board of Commerce. In connection with this Tour they also sponsored one of the first Aeronautics Expositions in Michigan, which was held in a large tent at the Ford Airport.

The Wilkins' Arctic Expedition and the Wilkins' Detroit News Arctic Expedition of 1926-27-28 were sponsored jointly by the Detroit News and the Detroit Aviation Society. During one of their expeditions, Sir Hubert Wilkins and Lieutenant Karl Ben Eilsen flew in a Lockheed airplane from Point Barrow, Alaska, to Spitzbergen. They also explored much of the Arctic waste land by airplane.

In 1927 the Detroit Aviation Society shared in the sponsorship of the International Balloon Races, which started from the Ford Airport at Dearborn, Michigan. It is interesting to note that this race was won by two Detroiters, Edward J. Hill and A. G. Schlosser, both members of the engineering staff of the Aircraft Development Corporation. One of the novel features of their balloon was the absence of the customary net, used to reinforce the gasbag of the balloon.

The Detroit Aviation Society is still maintaining its interest in promoting Detroit as the aviation center of the United States and its future programs are being looked forward to with much interest. The present officers are: William B. Mayo, President, Charles T. Busch, Treasurer and Carl B. Fritsche, Secretary. Russell A. Alger was the first president of this organization.

Among the first college aeronautical clubs of the country was the Michigan Aero Club at the University of Michigan proposed in December 1910 and officially formed in 1912 and the Michigan Agricultural College Aero Club, East Lansing, formed in May, 1911. Both clubs engaged in glider-flying. The Aeronautical Society of the University of Detroit was proposed and formed in 1921, which was also the year in which the course in aeronautical engineering was inaugurated at that University.

THE NATIONAL AIR TOUR

The first Tour was sponsored jointly by the Detroit Board of Commerce and the Detroit Aviation Society. The purpose of the tour was to demonstrate to the public throughout the United States the feasibility of travelling great distances by airplane. Indirectly, it also served as an excellent flight laboratory, which enabled the designer and builder to learn about many of the servicing difficulties usually encountered on long flights and continuous schedules. Many things were learned which could not readily be determined by flight tests at the factory airport.

The first Tour lasted six days. It started September 28, 1925, and ended October 3, 1925. The route was from Detroit to Omaha, Nebraska, and return and was one of the first tours of its kind in the United States. This Tour was not conducted on a contest basis, but merely to prove the practicability of the commercial airplane. Mr. Edsel B. Ford of the Ford Motor Company presented the Tour Committee with a beautiful trophy which was to become the property of any contestant who won first place for three consecutive years. This trophy was won once by Edward A. Stinson of the Stinson Aircraft Corporation in 1927, and twice by the Ford Motor Company, in 1930 and 1931.

The National Air Tour was one of the most closely contested events in the United States. Practically every manufacturer of importance was represented in it by one or more airplanes. Its route was varied from year to year and extended throughout the United States and parts of Canada and Mexico. The starting and finishing points for all routes was at the Ford Airport. The tour was discontinued in 1932 because of the general business depression. Mr. William B. Mayo, then Chief Engineer of the Ford Motor Company, was Chairman of the Tour Committee. Peter Altman of the University of Detroit was Chairman of the Rules and Formula Committee, which revised the original formula and rules in 1929.

THE MICHIGAN AIR TOUR

This event was organized by the Pontiac Board of Commerce to stimulate interest in commercial aviation and particularly in the building of airports throughout the State of Michigan. The first Michigan Air Tour left the Pontiac Municipal Airport on June 10, 1929, toured the State of Michigan and returned to Pontiac on June 14, 1929. G. D. Kennedy was director and Glenn C. Gillespie was the chairman of the Aviation Committee. This event has been held each year since 1929, visiting most of Michigan's new airports, including the one at Mackinac Island.

THE DETROIT BALLOON CLUB

Ballooning was always an interesting sport to Michigan sportsmen as can be seen from the section on Pioneer Adventures, but it was not until 1925 that an official organization was set up to sponsor a complete program for ballooning in Michigan. In that year on December 5, the Balloon Section of the Detroit Flying Club was formed to promote (a) training of practical balloonists, (b) ballooning as a sport, (c) scientific research in the art, and (d) reserve military balloon training.

The club later changed its name to the Detroit Balloon Club. Its members have all been very active in ballooning in Michigan and several of them have participated in national and international events. Two of them, Edward J. Hill and Arthur G. Schlosser, won the Gordon Bennett International Balloon Race in 1927. The first officers of the club were: Ralph H. Upson, president; Judge H. S. Hurlburt, vice-president; S. A. U. Rasmussen, sec'y & treasurer; present officers are: Col. Sid A. Erwin, president, Arthur G. Schlosser, vice-president, Roy S. Cunningham, sec'y & treasurer.

NATIONAL GLIDER ASSOCIATION

(Evans Glider Clubs of America)

Although the use of gliders anti-dates the use of the airplane, and was participated in by many before and after the famous flight of the Wright Brothers in 1903, yet in 1928 the activity in this field was almost at a standstill throughout the United States, except perhaps the activity of a small group of glider enthusiasts at the Massachusetts Institute of Technology who built a glider and entered it in the German Glider meets.

Early in 1928, Edward S. Evans, a prominent Detroiter, became very much interested in the work which was going on in Germany in the use of gliders for sport and as a supplementary means of teaching pilots the fundamentals of flying. He sent his son Robert to the Wasserkuppe Mountain Glider School in Germany to take their Glider course and also to in-

quire into the plan used by the Glider Association of that country to carry on its activities.

With this information in hand, Mr. Evans formed the Evans Glider Clubs of America in 1928 with the purpose of reviving interest in gliding in the United States. At the same time Mr. Penny of New York, was conducting a gliding school at Cape Cod, Massachusetts, with the use of some German gliders for his equipment. Mr. Robert Evans also attended this school and then with the combined information gathered in Germany and Cape Cod, organized a Glider Club at the University of Michigan. At about the same time a similar club was organized at the University of Detroit. The Glider Club at the University of Michigan purchased a glider and began their gliding activities immediately. The Club at the University of Detroit designed and built its own glider and as a result started its activities at a later date. Both clubs have done very fine work and are still active in this field. The University of Detroit Glider Club has built a novel secondary glider of their own design which was entered in the 1937 National Soaring and Gliding meet at Elmyra, N. Y. It also was entered in the design contest. No awards, but a showing was made. A Michigan made and designed glider won the contest at Elmyra in 1937, the winner being Arthur Schultz of Detroit. The U. of D. Glider Club is now building a second glider for training purposes, which should be ready by April. The Franklin Utility Glider was developed through the activities of the U. of M. Glider Club by Professor Franklin and became one of the most popular secondary gliders in the United States.

Glider Clubs soon appeared in all sections of the country, and in order to be of the greatest assistance to these organizations and give this activity a national scope, Mr. Evans changed the name of his original group to the National Glider Association, on December 29, 1928. This association, with Mr. Edward S. Evans as president and Donald F. Walker as manager did excellent work in promoting glider activities throughout the United States. It sponsored glider meets,

furnished glider drawings, supplied important data on the art and science of gliding and in general came to the aid of all seeking to enter the field of this fascinating sport. Unfortunately, due to the general business depression, the National Glider Association became inactive in 1932. The Soaring Society of America, Inc. has taken its place. Richard Du Pont is president, with offices in Philadelphia.

The Pioneer Glider and Soaring Society is another organization to which credit should go for the revival of the glider activity in Michigan. This organization was founded on January 19, 1929 by W. J. Scripps of Detroit and J. C. Penny, Jr. of New York. The officers were Penny, president; Scripps, treasurer; Mark A. Kearney, vice-president; and E. W. Sawyer, secretary. This group sponsored the soaring meet held at Cape Cod, Massachusetts in 1929 and were also responsible for a number of glider events in the State of Michigan. They established a glider site at Lake Orion, Michigan.

The State of Michigan can boast of the first manufacturing organization which was devoted exclusively to the building of gliders. This organization, known as Gliders Incorporated, had a plant at Lake Orion, Michigan, where they built a number of primary type gliders. They also maintained a very complete gliding camp near their plant on a farm owned by William E. Scripps. Mr. Scripps' son, William J. Scripps, was president of the company. Gliders Incorporated was absorbed by the Detroit Aircraft Corporation in 1930.

Professor R. E. Franklin organized a small but active glider manufacturing plant in 1930 at Ypsilanti, Michigan. His design known as the Franklin Utility Glider was quickly accepted by glider pilots as one of the best suited for training purposes as well as for general soaring practice. Many gliders of this design were built and sold in all sections of the country.

AERONAUTICAL ACTIVITIES ASSOCIATION OF MICHIGAN

This organization was formed in 1933 to take over the former activities of a number of different groups in Michigan. It is

active in reviving public interest in aviation and has sponsored a number of affairs at local airports to get the people of Michigan to again lend their support to aviation programs; an interest which became very low because of the general business depression.

DETROIT BOARD OF COMMERCE

The Aviation Committee of the Detroit Board of Commerce has been one of the most active groups attempting to encourage and promote the centering of the aircraft industry in Detroit and the State of Michigan. It has been responsible for many of the successful aviation events in this state, as well as being the leading factor in the establishment of new aircraft plants in this section. It sponsored the All-American Aircraft Shows and a number of the National Aircraft Shows and played an active part in the Airport Program of Michigan, particularly that of Detroit.

REGULATING AGENCIES (U. S. Dept. of Commerce)

The Federal Air Commerce Act of 1926 placed the regulation of Interstate flying activities in the hands of the United States Department of Commerce. This involved supervision over flying activities as well as the licensing of aircraft. In April, 1928, one of the first regional offices of the Aeronautics Branch of the Department of Commerce was opened in Detroit in the Transportation Building. Marshall S. Bogg was the first Supervisor for this area. He was succeeded by Howard F. Rough on July 1, 1928. Mr. C. Neely is now in charge of the Detroit office. Present headquarters of the division are at the Wayne County Airport.

Michigan was one of the early states to recognize the responsibility of controlling and regulating inter-state aviation activity and to take steps toward supplementing the work of the United States Department of Commerce, Aeronautics Branch, in the establishment of ground facilities and in the enforcement of the air traffic laws. The State Board of Aeronautics was

formed to enable the state to legally take this action and to provide an agency for the enforcement of its regulations.

MICHIGAN STATE BOARD OF AERONAUTICS

A complete report on the purpose and activities of this organization may be found in a report published by this Board in 1933. Only a brief outline will therefore be given here.

The Michigan State Board of Aeronautics was created under Act 177 of the Michigan Public Acts of 1929. The members of the Board consist of five commissioners appointed by the Governor for a period of four years, to serve without pay. The Board began its operations in October, 1929, with William B. Mayo of Detroit as chairman and Ray Collins of Detroit as director and secretary. Other members of the Board were: Claude S. Carney, Kalamazoo; Harry Fletcher, Alpena; William Sparks, Jackson; and Frank Betts, Menominee. The present Commission consists of the following: Mr. William B. Mayo, chairman; Mr. Carl Keller, Detroit; Mr. Tom Walsh, Grand Rapids; Mr. William F. Murray, Detroit; Mr. Herbert J. Norton, Escanaba; Mr. Murray D. Van Wagoner, State Highway Commissioner; and Mr. Oscar G. Olander, Commissioner of State Police. Offices are located in Lansing.

Mr. Collins resigned in December 1930 and Floyd E. Evans of Detroit was appointed in his place. Mr. Evans is the present Director and Sheldon B. Steers, Inspector. Mr. Evans was very active in the organization of the aviation unit of the Michigan National Guard, which is located at the Wayne County Airport, and holds the rank of Lieutenant Colonel in this organization.

The purpose of the Board is to promote aviation activities in the state, develop airports and regulate intrastate flying. It has established an excellent record of accomplishments and has been largely responsible for the many airports and flying fields now in existence in all parts of the state.

HISTORICAL NOTES

THE annual meeting of the State Historical Society will this year be held in Detroit. All persons irrespective of membership are cordially invited to include this event in their vacation plans and to attend and enjoy the historical tours and programs outlined below. The Society's program will be merged in a joint program with the Ontario Historical Society of Canada, the Detroit Historical Society, Wayne University and the University of Michigan, June 9-11. Headquarters will be the Statler Hotel. Reservations for accommodations should be made well in advance directly with the hotel. Following is a tentative outline of the program:

THURSDAY, JUNE 9:

9-12 a. m. Canadian contingent will meet by themselves at the Prince Edward Hotel in Windsor for the purpose of registration and other business pertaining to the Ontario Historical Society.

9 a. m. A literary program to be arranged for the American contingent at Statler Hotel. The proposal is being made for a conference of Michigan college and university teachers of history. If this is not carried out, an alternative program of historical addresses will be arranged.

12 o'clock The Americans will proceed to the Prince Edward Hotel in Windsor or luncheon with the Canadians.

Program: General welcome and information by Chairman.

Address of welcome by Mayor Ernest Wigle.

Historical address "The American Element in Upper Canada in the War of 1812," by Professor Fred T. Landon, of University of Western Ontario.

2-4:30 p. m. All present will be taken on an historical tour of Windsor, Sandwich, and Amherstburg, details to be arranged by Messrs. Macdonald and Marsh, representing the Ontario Historical Society.

4:30 p. m. The party will assemble on the lawns of Mrs. McGregor and Mr. Hough, occupying the site of Fort Malden at Amherstburg, where an open-air supper will be provided by the citizens of Amherstburg.

Program: Address of welcome, Mr. John A. Marsh, Editor of Amherstburg Echo.

"The Historic Associations of Amherstburg and Vicinity," Mr. George F. Macdonald.

"The Moravian Reservation on River Thames," Mr. F. C. Hamil, Birmingham, Mich.

It is presumed that the program will be ended by 7:00 or 7:30. No provision is being made for any further activities on Thursday. In the event of bad weather, the Amherstburg program will be held in the High School auditorium instead of on the lawns of Mrs. McGregor and Mr. Hough.

FRIDAY, JUNE 10:

Both Canadians and Americans will assemble at the Statler Hotel in time to leave for Fort Wayne at 9:30 a. m. Mr. Henry Ford will have buses in readiness to convey the entire party to Fort Wayne, where it will be welcomed by Col. Churchill and conducted on a tour of inspection of the fort. The party will leave Fort Wayne at 11:30 for Dearborn Inn.

12:15 Luncheon, price \$1.00, in Ball Room of Dearborn Inn. Address by Mr. William J. Cameron of the Ford organization.

Following the luncheon and address, the party will be the guests of Mr. Ford on a tour of Edison Institute and Greenfield Village, leaving in time to permit of being conveyed to the Statler Hotel in time for the evening program.

6:30 p. m. Dinner at Statler Hotel, in Ball Room. Price \$2.50

Chairman, Mr. Orla B. Taylor, President, Detroit Historical Society.

Addresses:

Governor Chase S. Osborn, "Fixing the boundaries; or settlement of the Great Lakes Basin."

Mr. Louis Blake Duff of Welland, Ontario, past president of the Ontario Historical Society.

Topic to be supplied.

SATURDAY, JUNE 11:

The Canadian contingent will come to the Statler Hotel where all will assemble in time to depart for Ann Arbor at ten o'clock. Buses will be provided, the passengers paying for their own transportation. Details of the bus service still to be arranged.

At Ann Arbor the University will tender a complimentary luncheon to the party at 12:15 o'clock and an address will be given by President Ruthven. Following the luncheon and the address, the University will conduct the visitors on a tour of the Campus, including the Clements Library. Details of the afternoon program are still to be arranged. Buses will return to Detroit either separately or all together at whatever time those being transported may find desirable.

THE State Historical Society lost a devoted friend in the death of Mr. James H. Brown of Battle Creek who passed away at his home in that city in January.

While the construction of the History Stone Tower in Battle Creek was the principal interest in Mr. Brown's life at the time of his death, he was also widely known as a writer on historical subjects, a farm paper editor, an authority on many phases of agriculture and good roads, and the sponsor of historical automobile tours conducted over a period of fifteen years.

Mr. Brown was born in Saratoga, New York, January 19, 1859. He came to Michigan in infancy and spent his early life on the farm in Charleston township, three miles northeast of Climax, where his parents settled three-quarters of a century ago. He came to Battle Creek some forty years ago and about the same time was appointed by Governor Hazen S. Pingree as a member of the State Livestock Sanitary Commission.

As a member of this Commission, Mr. Brown made the first tests of dairy cattle on several farms, and urged the need of a legislative appropriation to partially compensate the farmers whose cattle were found to be tuberculous and condemned to slaughter. For several years the legislature declined to pass a bill to pay the farmers for cattle seized and destroyed. Finally an appropriation was made, and within twenty years a large majority of Michigan dairy cattle had been tested, condemned animals destroyed and partial compensation paid the owners for their loss. Since then bovine tuberculosis has been practically eliminated in the dairy herds of Michigan.

The first motor touring and camping caravan in the history of Michigan and the United States, was organized and conducted by Mr. Brown during school vacation in 1920. It was an educational, as well as a recreational pilgrimage, and was for the purpose of showing city and country folk of the southern counties of the state what there was to see and enjoy in the vast domain of both peninsulas. It was an eye-opener to every one of the nearly 200 tourists who rode in 63 cars in the cara-

van, with Mr. Brown's car at the head, and piloted by Hugh J. Gray, of the Western Michigan Tourist and Resort Association. This pilgrimage started from Battle Creek. It extended across the Straits of Mackinac and on to Sault Ste. Marie. The starting point, at Urbandale, is marked by a large boulder and bronze tablet. Above the tablet is embedded a small stone that was presented to Mr. Brown down below Plymouth Rock, at low tide.

In September, 1896, when Mr. Brown was on the *Michigan Farmer* staff, he learned that Michigan was to have an experimental Rural Free Delivery route. The National Grange and various farm organizations had for some years been agitating for rural free delivery. The Michigan Grange had taken a leading part. The Congress of 1892-93 made an appropriation of \$10,000 for experimentation. But the amount was believed too small to make any extensive trials and was left unused. In 1895-96 Congress appropriated an additional \$40,000, and in 1896 Postmaster General Wilson put the service to the test. Mr. Brown on learning of the plans immediately got in touch with Senator Julius C. Burrows, requesting that the Michigan route should be established in Climax, a strictly rural community. The story of developments that followed was told by Mr. Brown in an article he wrote for this Magazine, published in 1922. Accompanying the article is a picture of the R.F.D. Memorial Monument at Climax, showing on either side, each with his horse and buggy ready to go, Lewis Clark and Willis Lawrence, Michigan's first R.F.D. carriers. The monument, at Mr. Brown's suggestion, was built of stones brought from 230 farms first served by the rural routes of Climax. It was dedicated July 26, 1917,—the Michigan State Grange, D.A.R. of Calhoun and Kalamazoo counties, citizens of Climax, and the Michigan Rural Letter Carriers Association taking part in the ceremonies.

The Magazine in several issues of 1936 and 1937 carried editorial description of progress on the History Stone Tower,

the only memorial of its kind in the United States. (See especially the Autumn number of the Magazine for 1936).

In the Sunday edition of the *Battle Creek Enquirer and News*. January 9, appeared the following comment:

"The stone history tower stands in Post park with a jagged and uneven top, reaching after the completion which it has not yet achieved. And Jimmy Brown, tower builder, lies dead at his home. The tower as it stands there with its uncompleted top might represent more than history; it might also represent Life. For life it seems (and certainly the newspaper reviewers who so often must survey life's endings see it that way) is always leaving objectives uncompleted; jagged upper edges where the building plans could not be carried out before the Master of Works called time. Jimmy Brown was in the newspaper shop just a week or so ago, full of plans and blue prints and specifications—and full of letters and messages too, about the finishing of the tower—and that meant he would be off on some other similar enterprise. He had gotten to the plans for a dedicatory dinner; he had letters of encouragement and acceptance from many notables; he was forging ahead with the same assurance which marks the course of enthusiasm—often marks the conduct of childhood in its confident feeling that wishes will come true. No one who knew him would fail to say that Jimmy Brown was a "character." And he left his mark on his day and generation. There are history towers and markers at various places, planted there by him. The files are full of the stories of his undertakings; his trips and tours and plans. His own premises contain the most valuable and complete collection of photographs and accompanying records, of old time personages and affairs, to be found in these parts. All in all, Jimmy Brown was a gentle, genteel, friendly enthusiast in causes which reflected a deep love of home and country and a strong sense of citizenship responsibility. Once a well know writer, describing the end of a picturesque character, closed the story this way: "And in his dead eyes was the shadow of a thousand dreams." So it might be said of Jimmy. Peace to him. Life and the tower have uncompleted ends.

A MEMBER of the State Historical Society contributes the following:

"In the Summer-Autumn number of 1937 of the *Michigan History Magazine*, Professor James Cloyd Bowman of the Northern State Teachers' College, writing of the erection of the first saw mills in Michigan, says:

“The first saw mill in the State was set up at Saginaw by Uncle Henry Williams in 1834. . . . In the Upper Peninsula the first mill was built at Ontonagon in 1855. At Flat Rock, the Indian, Escanaba, the first mill went into operation in 1865.’

“Prof. Bowman, in his excellent article, has evidently forgotten the erection of the race way, saw mill and Fort Brady at Sault Ste. Marie in 1822, and the use of the saw mill and race way for the following thirty years. This saw mill was burned between July 11, 1826 and August 18, of the same year, and re-built at once, and Judge Goff, in his history of the Saint Mary's Falls Ship Canal, points to the controversy between the officials of the General Government and the State of Michigan, thus:

“Mr. Weeks, one of the contractors for the construction of the Saint Mary's Falls Ship Canal, in October, 1838, went to Sault Ste. Marie and looked over the ground for the projected work to see what was necessary to carry on the same, and early in 1839 he collected provisions, implements and men necessary to the prosecution of the work. He arrived at Sault Ste. Marie on the “Eliza Ward” on Saturday evening, the 11th day of May, 1839. Lieutenant Root, on the next day, notified him of the orders from Washington, which were in effect to prevent the interference with the race way operated by the Government to operate the saw mill by water power. Captain Johnson notified Mr. Weeks that his orders from Washington were positive. However, the contractor set his men, about fifty in number, at work precisely at the place in dispute, and Captain Johnson, of Fort Brady, having under his command about thirty regulars, armed with muskets and bayonets, with drawn swords, marched down upon them and ordered the workmen to stop, which they refused to do. Thereupon the captain wrested from James Sherrill, the foreman, his spade, and the workmen were driven from the grounds.’

“The burning of this saw mill was noted by Col. Thos. L. McKenney, in his book *Tour of the Lakes* on his return from

an Indian treaty making tour to Fond du Lac with Governor Lewis Cass, August 19, 1826, and fixing the date upon their arrival back to the Sault thus:

"We entered by the way of the race which had been cut by the soldiers to let in the water for a saw mill which had been destroyed by fire since we left here We were scarcely in our quarters before the landlady, Mrs. H—, announced the deaths of John Adams and Thomas Jefferson and handed us the papers, John Adams and Thomas Jefferson dying within a few hours of each other on the fourth day of July 1826."

HERE are some questions on the Flags of America. How many of them can you answer?

1. What are the symbols on the Spanish Flag under which Columbus sailed when he discovered the New World, and what do they represent?
2. What two flags were combined to make the British flag under which the British colonization of America was effected.
3. What three French flags have floated over parts of the territory that is now included in continental United States?
4. Under what two flags were the Dutch settlements in America made?
5. What was the first truly American flag?
6. On what early colonial flag were the thirteen colonies symbolized?
7. On what colonial flag did the 13 red and white stripes first appear?
8. From whence came the stars of the Stars and Stripes flag?
9. What is the significance of the colors of the American Flag?
10. What is the flag of the State of Michigan?

These are a few of the many questions answered in the little book, *Flags of America*, by Col. William H. Waldron, United States Army. The history of America is wrapped up in the Flags that have entered into the life of the nation. No col-

lection of adventure tales could be more thrilling than those which tell the story of the Flags. Give your boys and girls a copy of *Flags of America*. It will help to fill them with the spirit of the history of their country. The price is a dollar. It is published by the Standard Printing and Publishing Company, 912 Fifth Avenue, Huntington, West Virginia.

GOING through some old files the editor came across the following extract in a letter from the late George B. Catlin, Librarian of *Detroit News*. In reminiscent mood Mr. Catlin speaks of his old friend who was a collaborator in the Ross and Catlin *Landmarks of the History of Detroit and Wayne County*. The letter is dated September 11, 1925:

"Robert B. Ross who worked nearly 40 years on the News was another picturesque character of other days. I know considerable of his early life but did not know him until he was an old man. His father was a sort of Matthew Bagnet, a typical british soldier who fought with Wellington in the peninsular war and claimed to have been the first man over the wall at the storming of Badajos. Fought in the Crimea, in the Indian Mutiny and then retired to Quebec. Bob was born in the island of Ceylon and the first language he learned to speak was cingalese, learned from his devoted Ayah. He was a giant in build and a born adventurer. His father rescued him from the prize ring after he had been lured from home by fight promoters. He learned the printing trade and acquired the nomadic and bibulous habits of the craft in the 1850s.

"While working in New Orleans he joined Gen. William Walker's last expedition and participated in the conquest of Costa Rica and Nicaragua. During a general melee in a dance hall in one of the coast towns he was compelled to knife an antagonist. Fled on foot and by night for two weeks until he was picked up by a boat from an English coasting vessel and landed at Metamora, Texas. Set type on Memphis news-

papers and indulged in fistic battles with the stevedores and steamboat men for recreation. An ardent abolitionist, he went with the others when the entire staff threw down their sticks, threw in a few drinks and enlisted in the confederate army. Was assigned to the Lynchburg battery and arrived on the field of Bull Run with the troops who suddenly converted a northern victory into a helter-skelter panic. Was made a captain of a gun crew and fought in many battles. His stories of the slaughter of brave men at Marye Heights, Fredericksburg, and the stupidity of the Union commander made him sick to tell. His last service was at Gettysburg where his battery was lined up to pound the union lines in preparation for Pickett's charge. He and another gunner disputed as to which gun had blown up a yankee Caisson on Cemetery Hill and they left their guns to have it out on the spot just as the order to cease firing came.

"Word came through the lines that his father was dying in Toronto so he claimed the privilege of a British subject and got his discharge. After his father's funeral he joined a company of blockade runners and made three successful trips. Went ashore at Nassau with his old trunk containing \$1,500 in gold sovereigns and put it in his hotel room. Went down to the bar for a drink and when he returned to his room the trunk had been rifled. He never took a drink after that I believe. A sponger and wrecker landed him in Havana where he met the crew of a stranded and abandoned schooner. They were given the privilege of salvaging the ship, patched her up and navigated her to Halifax and so ended the wanderings of a modern Ulysses without a Penelope. Later he started a newspaper at St. Clair and then came to the News."

(Mr. Catlin wrote an extended account of Ross in the winter number of the Magazine for 1933.—Ed.)

Editor Michigan History Magazine :

REGARDING the old picture at St. Ignace, called "Loyola Renouncing the World", the following notes have been collected:

"The old picture at St. Ignace was brought with two others by

Father Bonneville from Ste. Ann's (Detroit) when the church was rebuilt in 1837. It is supposed to have been taken by Indians and concealed when the church was burnt." (F. C. Lee in *Souvenir of St. Ignace, Mich.*, 1895.)

"This painting was brought from Rome to France, next to Quebec and then to St. Ignace by Rev. Pere Bondel in 1832 and placed over the altar of the little church which he built that year." (*History of the Upper Peninsula*, Western Historical Society, 1883.)

"For the sake of historical truthfulness we may add another word about the ancient painting at St. Ignace and the chalice, both owned by the St. Ignace Church. It is certain that neither article enjoys the antiquity ascribed to it. The chalice was brought by Bishop Baraga, about 1854, probably. The painting is older. People of the Island remember that it was kept for a time at the Mackinac Church (Mackinac Is.). Whence it came? No one seems to know. The only one that claims to know about it is the old Indian, Satagon, now close to one hundred years old. He says that Father Bondell when he was building the church in 1837 received it together with the bell now in the Ursuline Convent, from the Bishop of Detroit. This opinion is nearer the truth. To those who hold that the painting dates from Pere Marquette's time, we will submit the following argument. If this painting adorned the first Jesuit Chapel at St. Ignace, how was it preserved to this day? Did it follow the Chapel to the lower point (Mackinaw City) and then to the Island? If it had, the Chapel on the Island would most likely have been known as the Church of St. Ignatius. Earliest records show it to have been St. Ann's (Catholic Directory, 1834, Ste. Anne's)."

(*History of the Diocese of Sault Ste. Marie and Marquette*, by Father Rezek, Houghton, Mich., 1907).

Rev. Father Jacker, an accurate historian, says the church was built by Father Bondel in 1838.

Translation of a Letter from Paris: (Martyrium)

9 Rue Antoinette, Paris, 18

Dear Miss Farrell [Margaret Farrell of Pittsburgh]; Mother Superior would have been happy to have satisfied your wish, and earlier, but knowing nothing on the subject of the painting in question we had to inform ourselves, and what we have found out is not very satisfactory.

We first of all addressed ourselves to a specialist in iconography, and have looked through with him all his collection of pictures of St. Ignace and also those of many other saints of the Company. Now in all the researches and comparisons which have been made, it comes

out clearly that the picture of which you sent the copy is not a portrait of St. Ignace, but undoubtedly of St. Louis de Gonzaga (Aloysius de Gonzaga ?). Either the artist, not having the model St. Ignace has taken one of St. Louis which he has baptized St. Ignace—or more likely this picture having been made to represent Louis de Gonzaga has been taken later after the disappearance of which you speak for a picture of St. Ignace—but that is an error. The features are not those of St. Ignace and the objects which surround the Saint are those which in the collections are found always assembled around St. Louis de Gonzaga (Gonzague).

It is impossible to state definitely anything on the subject of this painting and its origin, but it is thought that it cannot be traced back so far as the time of Pere Marquette.

With regret at not being better able to inform you,

Yours in N.S.

Marie de St. Matthieu, S.J.

[Member of a Jesuit sisterhood]

Legends of the Monastic Orders, by Mrs. Ann Jameson, Boston, 1888 :

p. 468. St. Ignatius Loyola . . . type never varies—never been idealized. Impressions in wax taken from his features after death—a square, high, powerful brow, a melancholy and determined, rather than stern countenance—Short black hair, bald on the temples; very little beard or a slight black mustache; head painted by Rubens, now at Warwick Castle, quite true to the Spanish type.

In general, Ignatius is distinguished by the IHS, the monogram of the Order, sometimes in a glory in the sky above, sometimes a tablet borne by angels. The heart crowned with thorns (the *Sacré Coeur*) is also an attribute.

"The subjects taken from his life have not been as far as I know or can learn, the most striking and picturesque incidents . . . ; not St. Ignace studying on his sick-bed, nor performing his midnight watch in the Chapel of Our Lady, hanging up his lance before Her altar and dedicating himself to Her service—nor the solemn vows in the Chapel at Montmartre—nor the prayer at Jerusalem—nor even his death scene. These *may* exist, but neither in pictures nor in prints have I met with them. The few subjects have been his visions, his miracles or his penances."

p. 484. St. Louis Gonzaga (St. Aloysius) Entered the Order before he was eighteen—represented in the black frock of his order with a young, mild and beautiful face and holding a lily in his hand.

St. Ignatius holds volume of rules of his Order.

p. 37. The Jesuits employed Rubens and VanDyck to decorate their splendid church at Antwerp. The best pictures painted for this order were by the late Flemish and Spanish artists.

With the letter, the French S. J. Sister sent several small pictures of the two saints, such as are commonly distributed in the churches and Catholic schools. Those of St. Aloysius Gonzaga show youth, and are accompanied by the cluster of lilies; those of Ignatius are older, bearded, slightly bald, and he is holding the book of rules of the Order, embossed with IHS, and in one with the Sacred Heart on a page of the book, as well as IHS.

The Metropolitan Museum of Art of N.Y. in 1928 reported that they were unable to locate any paintings of St. Ignatius Loyola or St. Aloysius Gonzaga in America. Their collection contained three photographic reproductions of paintings of St. Ignatius Loyola from European Galleries, one in Vienna, one in Genoa and one in Madrid.

The Frick Art Reference Library has several reproductions; two of them do not show the mustache or beard characteristic of the others; some have round, some oval features.

There is shown a picture of St. Louis de Gonzaga by Greco, with an oval (not round) face, but young; this is said to have been "formerly wrongly titled St. Ignace de Loyola."

Saints and their Emblems, by M & W. Drake, (London, 1916), gives as the symbol of Ignatius Loyola, His hand on book of his constitution; Christ appearing to him as he bears his cross; IHS heart pierced with thorns; IHS on breast or within rays on his hand, or above him in light.

That there are pictures of Ignatius Loyola in America is certain, but they are not in galleries; it may be supposed that they are mostly in cloistered chapels. Georgetown University is said to have a picture of St. Ignatius "which Father White brought from England to America."

In "A Memoir of Father Felix Joseph Barbelin, S.J." by Eleanor C. Dondelly, published for benefit of St. Joseph's Church, Philadelphia, 1886, is found this statement on pages 94-5: "It was somewhere along here (c.1733) that he [Father Greaon] received from England several valuable paintings in oil wherewith to decorate his little Chapel. One of them, a picture of St. Ignatius, Founder of the Society of Jesus, is still to be seen at St. Joseph's, having been inserted above the mantel in that room known as the Provincial's Room; another, the chef d'oeuvre

of some old Master, represents St. Francis of Assisi, contemplating a Crucifix, and is in the principal parlor . . ."

A visit to the Rectory and Church of St. Joseph's in Willing's Alley was made in December, 1932, but no picture of St. Ignatius was found, nor any information about it. The picture of St. Francis of Assisi, having, besides the crucifix, the lilies said to be characteristic of St. Aloysius, is still over the mantlepiece in the parlor.

In May, 1933, the church celebrated its bicentenary. In a booklet issued at that time, on page 34, the compiler says: "Among the paintings restored [by Father Reilly, around the time of the bicentenary or in 1904?—the date is not clear] are the first three paintings sent to Father Greateon from England about 1776: St. Ignatius, St. Francis of Assisi, and an Ecce Homo.

A letter from T. F. Graham, S. J., Dec. 19, 1933, states that they have a picture of St. Ignatius over the altar in "our Domestic Chapel." "I do not know whether it was brought over by Father Greateon or not. As the picture is practically imbedded in the wall, it would be out of the question to remove it. . . . our Chapel is cloistered. . . . I do not think that the picture referred to is of any artistic value."

A later letter from the same Father says, "I shall be only too happy to allow any man either to sketch or photograph the picture. I do not know that the picture of St. Ignatius is true to life, but I do know that it resembles any picture or statue that I have ever seen of the Saint. . . ."

In consequence of this letter, Mr. J. H. Fincken made an appointment and went to the Chapel to sketch the picture. The result is very striking but resembles in no way the picture at St. Ignace. It has the round face, slightly bald, and slight mustache. There is a halo round the head, cherubs in the clouds above, surrounding the IHS; the Book of Rules lies at the feet of the saint. Mr. Fincken thus describes it: "This sketch was made merely to show its arrangement and composition; the painting is in bad condition; is very dark, the robe being quite black; its shape and detail lost. The gold nimbus around the head of the Saint and the rays indicated by pencil are on an orange background which extends upward behind the blue circle in which are the golden letters IHS, becoming darker toward the top of the picture. Four cherubs emerge from behind dark clouds, the two on the left show wings. The book on the right has on its right page the words AD MAIOREM DIE [DEI ?] Gloria; its edges are painted red. It is the book of Rules or Spiritual Exercises of Loyola. The head of the Saint is well-defined and in rich but sombre colors, the shadows are dark. There is a slight mustache but no beard; the head bald with dark hair suggested above and behind the ear."

THE ST. IGNACE PICTURE

From a cursory study, the symbols seem to be more appropriate to Ignatius Loyola than to Gonzaga; the face and form more appropriate to Gonzaga. Certainly there are the IHS and the Sacred Heart; there are no lilies, and the objects cast away are more likely to have belonged to the life-story of Ignatius than to that of Gonzaga, unless in a general sense they represent what any young man of the time would give up in renouncing worldly pursuits.

The legend of its placing is interesting; the identification is also a matter for conjecture and further search.

There are, however, in the St. Ignace picture, the skull and the flagellant whip sometimes shown in the Aloysius Gonzaga pictures.

It seems a pity that Mrs. Ann Jameson, could not have found the St. Ignace picture. She would have found in it the elements she lamented as lacking in the portraits of St. Ignatius that she later saw in her tour of Europe.

Marion Morse Davis (Mrs. E. M.)
1512 Spruce St.,
Philadelphia, Pa.

AMONG THE BOOKS

GEORGE WASHINGTON AND THE WEST. By Charles H. Ambler, Professor of History, West Virginia University. University of North Carolina Press, 1936, pp. 270. Price \$4.

A readable account of Washington's experiences as a surveyor, his campaigns on the frontier, his real estate investments in the West, and his promotion of internal improvements to connect the West with the East.

THE OLDER MIDDLE-WEST, 1840-1880: ITS SOCIAL, ECONOMIC, AND POLITICAL LIFE AND SECTIONAL TENDENCIES BEFORE, DURING, AND AFTER THE CIVIL WAR. By Henry C. Hubbart, Professor of History, Ohio Wesleyan University. Appleton-Century Co., N. Y., 1936, pp. 305. Price \$3.

An able post-frontier study supplementing the excellent frontier literature of the Turner school. Devoted largely to politics of the section and period. Has four excellent chapters on social and economic features, but leaves open the entire field of the agricultural revolution from subsistence farming to speculative investment in the soil. The central theme is the role played by Southern Ohio, Indiana and Illinois in state and national politics 1840-1865, as the focal point around which American history revolved. A genuine contribution is the friendly interpretation of those democratic tendencies in the North which have been crudely denounced as "Copperheadism".

STEAMBOATING ON THE UPPER MISSISSIPPI. By William J. Petersen. State Historical Society of Iowa, Iowa City, 1937, pp. 575.

Another beautiful volume by this enterprising historical society of a sister state. Good art as well as good history. The format of these publications is a model of good taste and serviceability, uniformly maintained and guided by Secretary Benjamin F. Shambaugh. As he writes in the foreword, here is the story of the Great River, water way to Iowa,—many steamboats, steamboat captains, steamboat cargoes, steamboat excursions, vanishing red men, Indian treaty grounds, frontier military forts, soldiers coming and going, emigrant pioneers marching westward, visions of Empire. A delightful volume.

THEIR WEIGHT IN WILDCATS: TALES OF THE FRONTIER. James Daugherty, editor. Illustrated. Houghton Mifflin, Boston, 1936. pp. 188. Price \$3.

A refreshing group of backwoods scenes and heroes, real and mythical. Here are Daniel Boone, Lewis Weitzel, Simon Kenton, Kit Carson, Johnny Appleseed, John Henry, Mike Fink, Jim Beckwourth, Davy Crockett and many other real heroes and folk heroes. A one volume library of the brave days of the western wilderness.

THE AARON BURR CONSPIRACY. By Walter Flavius McCaleb. Expanded edition with introduction by Charles A. Beard. Illustrated. Published by Wilson-Erickson, N. Y., 1936, pp. 318. Price \$6.

Practically a reprint of a work published in 1903. Presents views generally accepted by historians. The "expansion" consists in a prologue in which Burr's earlier life is sketched, and a considerable revision of the final chapter "The Last Years" to include new data.

THE SAINT OF THE WILDERNESS: ST. ISAAC JOGUES, S. J. By John J. Birch. Benziger Bros., N. Y., 1936, pp. 236.

A chronicle of adventure, courage, heroism and self-sacrifice. Father Jogues was put to torture and death by the Iroquois in 1646. He was at the Sault with Father Raymbault in 1641. An inspiring book.

THE REVEREND FISH CADLE: A MISSIONARY OF THE PROTESTANT EPISCOPAL CHURCH IN THE TERRITORIES OF MICHIGAN AND WISCONSIN IN THE EARLY NINETEENTH CENTURY. By Howard Greene. Davis-Green Corporation, Waukesha, Wis., 1937, pp. 163.

A sympathetic portrait of missionary life in the 1820's. Rev. Richard Fish Cadle incorporated St. Andrews' parish, Ann Arbor; St. John's of Troy in Oakland County; many others in Michigan. He was rector of the Episcopal Church in Detroit in 1824 and a charter member of the Michigan Historical Society which was founded in 1828 by Lewis Cass and others. Pioneer of the church, army chaplain, educator of the Indians, promoter of Bishop Kemper's movement in religious education. The text of this volume is based on the Kemper manuscripts and diary and the Proceedings of the Board of Directors of the Domestic and Foreign Missionary Society. Contains numerous quotations from these sources. A friendly study of the obstacles to the growth of the Episcopal Church on the frontier.

HISTORIC ST. JOSEPH ISLAND. By Joseph and Estelle Bayliss. The Torch Press, Cedar Rapids, Iowa, 1938, pp. 237. Price \$2.

A straightforward story, well organized, and unusually well written. Illustrative details are selected with a keen sense for the historically important. The result is a clear picture of this romantic island drama in its larger historic setting. The volume is supplied with an introduction by Dr. M. M. Quaife. An appendix contains a reprint of an address by Dr. Quaife, "A Soldier of Fort St. Joseph: Sergeant James Keating." A second appendix gives a series of letters picturing "Life at St. Joseph 1807-1812." A brief bibliographical note is added, and a distinctly good index. Altogether a model of local historical workmanship.

THE CRUISE OF THE GULL-FLIGHT. By Sidney Corbett. Illustrated by Bernard Westmacott and S. D. Brown. Longmans, Green and Co., N. Y., Toronto, 1937, pp. 367. Price \$2.

A fine story of the Lakes for boys and girls. Kay, Spinach, Brick, Teddy and Morgan, five cousins are the crew of the schooner Gull-Flight upward bound from Grosse Ile on a voyage through Lake Huron to Georgian Bay and the North Country. Sailor Bill, their Navy uncle, goes along. Storm and calm, camp fire, galley range, woods and water, form the background of a succession of unforeseen and amazing adventures. The author, who lives in Detroit, served in the Navy as gunner's mate during the World War, also in the Army—nineteen months overseas. In 1933 paralysis put him in the hospital. While written from a bed, the story shows intimate knowledge of life aboard ship. Kay and Brick are the author's own children.

Museum workers will be interested in the following books about museums, all published by The American Association of Museums, Smithsonian Institution, Washington, D. C.:

Manual for Small Museums. By Laurence Vail Coleman, 1927, 395 pages, illustrated. Price \$5.00.

A comprehensive handbook on museum principles and methods, for use of museum trustees, directors, and curators.

Handbook of American Museums. 1932, 787 pages. Index. Price \$5.00.

A descriptive directory of more than 1400 museums in the United States and possessions, with an appended list of museums in Canada and Newfoundland. Gives information on origin and administration of each museum, finances, buildings, land, collections, publications, educational work, field work, hours of admission, and attendance.

Historic House Museums. By Laurence Vail Coleman. 1933, 187 pages, 66 illustrations. Price \$2.50.

In three parts—(I) a short history of houses in America; (II) a manual of methods for those in charge of historic house museums; and (III) a statement of a new conception as to the future of museums in relation to the highway. With a directory of 400 historic house museums in the United States.

A Bibliography of Museums and Museum Work. By Ralph Clifton Smith. 1928, 310 pages. Price \$5.00.

An index to items in leading periodicals and to other literature on museums.

The Industrial Museum. By Charles R. Richards. 1925, 117 pages, illustrated. Price \$3.00.

A report of field studies of industrial museums in Europe.

Industrial Art and the Museum. By Charles R. Richards. 1927, 102 pages, illustrated. Price \$1.50.

A report of field studies of industrial art museums in Europe with an analysis of the relation of industrial art to American museums.

Directory of Museums in South America. By Laurence Vail Coleman. 1929, 133 pages, 76 illustrations. Price \$3.00.

A reference work with short descriptive accounts of museums, zoological parks, aquariums, and botanical gardens.

AN HISTORICAL item of value is the abundance of new books dealing with the hitherto little known formative period of American history in the latter part of the 18th and early 19th century.

Literary and historical folk have supplied books aplenty of the later pioneering movement across the great plains. Not so of the post-Revolutionary Period. For the decades during which the American nation was really determining its pattern we have not much interpretive literature. Particularly is this true of the doings of ordinary people, the thinking, the aspirations, the conflicts in the hearts and souls of men which must underlie the climaxes of wars and politics that find their way into the pages of histories.

And singularly enough, authors have seemingly awakened to the tremendous drama of that period concurrently with others who conceived a national historic commemoration to better familiarize America with the history of its own moulding.

One might suspect that Northwest Territory Celebration officials had inspired a gargantuan history writing campaign. The number is large of truly splendid books which have very recently appeared and which contribute importantly to our understanding of the foundation upon which the United States was built into the present nation. It seems to be true, with one possible exception, the writers have each reached their conclusions as to the worth and vitality of this phase of American life entirely independent of suggestion from that Celebration Commission. In most cases there is no evidence the writers had knowledge that a National commemoration was to be held.

Apparently the coincidence is due solely to the importance and the human interest of this formative period so long neglected and obscured. It is now suddenly coming into its own and bids fair to find a valuable place in our interpretive literature and history.

That the hitherto little realized significance of the period has struck home with authors is evidenced by some of their recent comments.

Meade Minnigerode, author of *Black Forest*, says, "Six months ago the Ordinance of 1787 and Northwest Territory—and that period—were merely words to me. Today they are meat, bread and drink.

Why haven't I known—why hasn't America known that wonderful history? I'm going to write it as it should be written."

Lois Lenski, author of *A-going to the Westward*, writes: "It was a whole new chapter of American History opened up to me. So much emphasis has been placed on the far west emigration; this earlier stage is far more interesting and much less is generally known about it."

Charles F. Lender, who became so enthused that *Down the Ohio with Clark* resulted, says of the period and its history: "I am heart and soul in line with this revival of interest in our pioneer past."

Nor are the recent books confined to any one type of literature but range through historical fiction, biography, verse and technical research.

The very recent books which deal with one or more important phases of this era are:

BLACK FOREST. By Meade Minnigerode. Farrar & Rinehart. Price \$2.50.

Dependable history of 1754 to 1787 made readable and exciting by the weaving in of romance. Published October, 1937, and now in its third printing.

NORTHWEST PASSAGE. By Kenneth Roberts. Doubleday Doran. Price \$2.75.

A splendid tale of the search by England for a Northwest passage to the east Indies—continuing almost to Revolutionary War days and indicating one of England's great reasons for not willingly giving up Northwest Territory.

DOWN THE OHIO WITH CLARK. By Charles F. Lender. Thomas Y. Crowell. Price \$2.

A thrilling narrative of George Rogers Clark's exploits in the Ohio Country. For young and old.

THE AMERINDIANS. By Donald M. McNicol. Frederick A. Stokes Co. Price \$2.50.

Compelling and largely original research as to the history of the Indians, giving enlightening and startling information as to their relations with the whites in America.

A-GOING TO THE WESTWARD. By Lois Lenski. Frederick A. Stokes Co. Price \$2.

Delightful story of a covered wagon and flatboat trek by pioneers from Connecticut to Ohio in the first years of the 19th Century. For both youngsters and oldsters.

FRONTIER VERSE. By Elizabeth Peck. Doubleday Doran. Price \$2.

Pleasing verse of the whole westward movement of America but including many of the sagas of the Old Northwest.

THE FIRST REBEL. By Neil Swanson. Farrar & Rinehart. Price \$3.

A jolting piece of research as to the beginnings of our Revolutionary War in excitingly readable form and splendidly documented.

MAINLAND. By Gilbert Seldes. Scribners. Price \$3.

An economic and political treatise for modern days but placing due emphasis upon the Ordinance of 1787 along with other indicative history.

OLIVER POLLOCK. By James A. James. Appleton Century. Price \$1.

A Biography of an almost unknown patriot who rivalled Robert Morris in financing the upheaval which became the United States.

THE WEST IN AMERICAN HISTORY. By Dan Elbert Clark. Thomas Y. Crowell. Price \$3.50.

One of the newer textbooks of the period.

BUCKSKIN BRIGADE. By L. Ron Hubbard. Macaulay. Price \$2.

A racy tale—said by the author to be based upon authentic documents in behalf of the Indians and not very complimentary to early white traders.

MERIWETHER LEWIS, TRAIL BLAZER. By Flora M. Seymour. Appleton-Century. Price \$2.

A story for young and old of the great exploration of the far west which followed shortly after establishment of the "Old Northwest".

THE ORDINANCE OF 1787 and OLD NORTHWEST TERRITORY. By Harlow M. Lindley and Associates. Northwest Territory Celebration Commission—Federal—Marietta, Ohio. Price 10 cents.

The first brief and concise but reasonably complete history for school and adult use of these factors in development of America. A good framework around which to build reading of many other books upon the subject. Briefly reviewed in the winter number of the Magazine.